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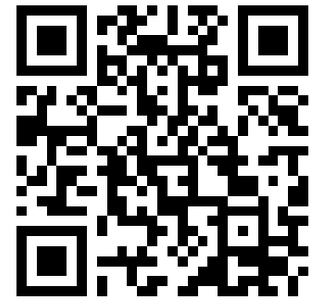

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THE

Tramway & Railway World

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

SOUTH INDIAN RAILWAY COMPANY.

CARRIAGE FITTINGS.

The South Indian Railway Company, Limited, are prepared to receive tenders for the supply of Carriage Fittings (Metre Gauge), comprising :—

Wrought iron and steel.
Hardware.
Glass.
Screws.
Sundries.

Specifications and forms of tender may be obtained at the Company's offices.

Tenders, addressed to the Chairman and Directors of the South Indian Railway Company, Ltd., marked "Tenders for Carriage Fittings," must be left at the offices of the Company not later than one o'clock on Wednesday, July 19th, 1916.

The Company is not bound to accept the lowest or any tender.

A charge, which will not be returned, will be made of 10s. for each copy of specification.

Copies of the drawings may be obtained on payment at the office of Robert White, Esq., M.Inst. C.E., Consulting Engineer to the Company, 3, Victoria Street, S.W.

91, York Street, Westminster, S.W.
June 28, 1916.

PLYMOUTH CORPORATION.

STEAM BOILER FEED PUMP.

The Plymouth Corporation is prepared to receive tenders for a Rotary Steam Boiler Feed Pump.

Specification and form of tender may be obtained from the undersigned after deposit of 20s. per copy, which will be returned after receipt of bona fide tender.

Sealed tenders, endorsed "Contract No. 33," to be delivered to the undersigned before 12 noon, Thursday, July 20.

E. G. OKELL,
June 28, 1916. Borough Electrical Engineer.

CITY OF ABERDEEN.

ELECTRICITY DEPARTMENT.

TURBO-ALTERNATOR.

The Corporation of Aberdeen are prepared to receive Tenders for the supply, delivery and erection at their Electricity Works, Millburn Street, Aberdeen, of one 5,000 kw. turbo-alternator to run at a speed of either 1,500 or 3,000 r.p.m., together with surface condenser and auxiliaries.

Specification, general conditions, and form of Tender may be obtained on application to the undersigned on payment of a deposit of £1 1s., which deposit will be returned after a bona fide offer has been received and opened.

Duplicate copies of specification, etc., may be had on payment of 5s. per copy, not returnable.

Sealed Tenders marked "Turbo-Alternator," and addressed as under, to be delivered here not later than 12 noon, on July 7, 1916.

J. ALEX. BELL,
Millburn Street, Aberdeen. City Electrical Engineer.

COUNTY BOROUGH OF ROTHERHAM.

The Rotherham Corporation invite tenders for their requirements, during the ensuing twelve months, of the following :—

1. Tramway stores and materials, printing, stationery, oils, grease, tools, brake blocks, paints and varnishes, lamps, etc.
2. Smudge and pea nuts.
3. Single vulcanised bitumen cable, high-tension cable, rubber insulator cable, and trolley wire of various sizes.
4. Ampere hour meters of sizes and maximum currents of 2, 5, 10, 25, and 50 amperes, supply pressure 230 and 430 volts.
5. Motormen's oilskin coats and conductors' mackintosh coats.

Forms of specification, tender and particulars can be obtained on application to the Engineer and Manager, Electricity Works, Rotherham.

The persons or firms whose tenders are accepted will be required to enter into contracts which will contain the usual Fair Contracts Clause.

The tenders, properly endorsed, to be sent to me not later than July 3 next.

By order,
CHAS. L. DES FORGES,
Town Hall, Rotherham. Town Clerk.

POSITIONS VACANT.

COUNTY BOROUGH OF NEWPORT.

ELECTRICITY DEPARTMENT.

Junior Engineers-in-Charge are urgently required. Must have been employed at least two years in a works of not less than 2,000 kw. capacity. Experience in running of steam plant essential. Wages to commence at £2 5s. per week of fifty-three and one third hours, overtime afterwards at single time during the period of the war. Applications in candidates' own handwriting, stating age, together with three references, to be sent in at once to the undersigned.

A. NICHOLS MOORE,
Borough Electrical and Tramways Engineer.
Town Hall, Newport, Mon.
June 26, 1916.

JUNIOR DRAUGHTSMAN.

Junior Draughtsman wanted for an electricity supply undertaking.—Apply, giving particulars, age and salary required, enclosing copies of not more than three testimonials, to the Burgh Electrical Engineer, Blackhall, Paisley.

FOREMAN PLATELAYER.

Wanted, Working Foreman Platelayer. Permanent job. Apply, giving particulars of experience and wages required, Engineer and Manager, Rhondda Tramways Company, Ltd., Porth.

LEEK URBAN DISTRICT COUNCIL.

CHIEF ASSISTANT ENGINEER.

The Lighting Committee of the above Council invite applications for the position of Chief Assistant Engineer and Manager of their electricity undertaking. Salary, £160 per annum.

Applications, to be sent in, on official form only, with three copies of recent testimonials, endorsed "Assistant Engineer," and addressed to the Chairman of the Lighting Committee, Town Hall, Leek. Applications to be sent in by 10 a.m., July 14, 1916.

Application forms to be obtained from Rd. H. Ginman, General Manager, Gas and Electricity Offices, Newcastle Road, Leek.

By order,
HAROLD HENSHAW,
Clerk to the Council.

LEEK URBAN DISTRICT COUNCIL.

JUNIOR ASSISTANT.

Junior Assistant required immediately for D.C. power station. Gas and Diesel engines.

Applicants should have had good technical training and some previous experience.

Salary 30s. per week.

Applications, stating age, experience, and when duties can be commenced, and accompanied by three recent testimonials, to be sent to, "Manager," Electricity Works, Leek.

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"THE TRAMWAY AND RAILWAY WORLD"
of June 8, contains a full description of this important, and in some respects, unprecedented undertaking. The description is supplemented by 35 photographs and drawings, including a map, profile of gradients and diagrams of tests.

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THE
Tramway AND Railway World

Established in 1892 and Published by

THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd., AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.

The TRAMWAY AND RAILWAY WORLD can be obtained, post free, at the following rates:—

FOR THE UNITED KINGDOM—Twenty-five Shillings per annum, including 64 issues, of which 12 are Illustrated numbers. One Shilling per Single Copy.

FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, JULY 1, 1916.

MR. ROBSON'S PLEA FOR THE PASSENGER.

In the operation of tramways the war has caused renewed consideration to be given to bedrock principles. As a recital of these and other conditions, Mr. W. T. Robson's paper presented to the annual congress of the Tramways and Light Railways Association, is a publication that ought to be studied by every committeeman who has failed to support his chairman and manager in resisting excessive demands for grants in relief of rates. To that evil is to be attributed one of the main causes of the lack of comfortable riding on many tramways. In suggesting that after nearly twenty years of electric traction the passengers are entitled to many things that on the average tramway they do not receive, particularly in the nature of a more comfortable ride, less noise, easier exit, and less petty annoyance, the Southampton manager does not rest content with pointing out defects. Numerous remedies are suggested, and the majority are of a comparatively inexpensive character. While admitting that track renewals are almost impossible of accomplishment during the war, he rightly states that much can be done in the way of repairs of a permanent nature, including the adoption of welding for the abolition of hammered joints. No excuse can be offered for the neglect of so simple a remedy as rail cleaning for reducing noise. As the greatest aid to more comfortable riding, Mr. Robson appeals for an improved truck, and although there is a difference in the nature of the two tracks, it cannot be gainsaid that railway practice is far in advance. There are indications of efforts to lessen discomfort by improvements in the hand-brake, but little is being done to secure the obvious advantages given by the substitution of cross-seats. An indication of a considerable advance that may be expected when peace is restored is to be seen in the arrangement of the interiors of the London trailers, and some omnibuses, which are provided with cross-seats except just inside the doorways. The longitudinal seat serves to accentuate the want of cushioned or spring surfaces. Whenever speed is accelerated or retarded passengers are brought into contact and progress is made in the process of giving a shining hue to their clothing. The efficacy of cushions in reducing road jolting has something to do with the popularity of motor omnibuses. Among other suggestions set forth there are three to which attention has been successfully devoted during the war. Newcastle has reaped decided advantages from a near side front exit and the use of books of tickets for workmen's traffic. In several towns the number of stopping places has been reduced, and Mr. Robson bears testimony to the satisfaction of the passengers. Managers generally will feel indebted to the author for a paper that will enable them again to bring to the attention of their committees many points upon which they have insisted in the past. Doubtless they will also agree with us that Mr. H. E. Blain's demonstration of the safety movement afford another proof that his transference to the great and untrammelled task imposed on the operating manager of London's omnibuses and underground railways has conferred substantial benefits on the metropolitan public.

SOUTH METROPOLITAN SETTLEMENT.

Mr. A. V. Mason, general manager of the South Metropolitan Tramways Company, has issued the following synopsis of the agreement arrived at with the Licensed Vehicle Workers' Union as the result of two conferences. The union's object was to raise the men's conditions to the level of those prevailing on the London County Council Tramways, while the company desired to postpone arbitration until the same conditions existed as before the strike.

Wages ½*d.* per hour increase to all grades.

Hours of labour Minimum of 60 hours for each week, with one day off a week. Overtime paid at rate of one and a quarter time for any hours over 60 each week rest days, Christmas Day, Good Friday, bank holidays. Spread over arrangement and pay as at present.

Women No change in conditions. Employed temporarily, and are paid same rates of pay as the men.

Free passes to all employees available at all times.

War bonus 2*s.* a week to any of the staff earning 40*s.* or under. Meter bonus to be remodelled on a monthly basis.

Spare men Present arrangements to continue, but a minimum wage of 22*s.* 6*d.* per week to be guaranteed, always provided that the man makes himself available on all occasions.

Holidays Two days with full pay for one year's service; five days thereafter.

Uniforms On the new ones being given out the old become the property of the employee, on condition he returns the company's badges and buttons.

Reports Present arrangement to continue that all employees to have the right to see General Manager with official reporting him on serious charges.

Inside staff Minimum wage of 6*d.* per hour except in the case of old men engaged on track greasing and other light occupations. The other rates of pay for the various trades employed in the car repair depôts and track are left to the general manager to deal with individually.

Recognition The directors have agreed to meet the union officials in matters of rates of pay and general conditions of service, provided the manager and employee cannot agree. The agreement to remain in force for three years until June 30, 1919.

TRAMWAYS AND LIGHT RAILWAYS CONGRESS.

The eighth annual congress of the Tramways and Light Railways Association was held yesterday (Friday) afternoon at the Westminster Palace Hotel, London, the Hon. Arthur Stanley presiding.

Mr. W. Tuke Robson, general manager, Southampton Corporation Tramways, submitted a paper entitled "Tramway Transit and Comfort: a Plea for the Passenger." The termination of the war would mean, in many cases, the acquiring of new rolling stock. This would afford an opportunity of striking out in directions free from hidebound obsolete design. The passenger was given a cheap ride, but not always a comfortable one, and in making plans for the future it might be well to consider how his comfort could be increased, with a view to inducing him to ride more often. Just before the outbreak of the war the author rode down a steep hill in the upper saloon of a car. The condition of the track and the car turned the ride into a species of nightmare. On reaching home he looked up the annual report of the undertaking, and found that £20,000 had been allocated to the relief of rates out of the surplus profits in the last four years alone. A small proportion of this amount would have been better spent in track renewals. At the present time track renewals were difficult, if not impossible, but much could be done in repairs of a permanent nature. Considering the facilities existing in the form of Thermit and arc welding, it was surprising that so many undertakings had not done more to abolish hammered joints. The impossibility of obtaining new rails at present should serve to wake them to the necessity

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of increasing the life of existing track by one or other of the means at their disposal, and at the same time remove a great deal of the disturbing noise that so many tramways suffered from. The question of rail groove cleaning had not received the consideration which was due to this method of reducing noise, and it was to be hoped that in the near future vacuum cleaning would bring about the desired result. It was in the direction of rolling stock that the hopes of a passenger desiring a more comfortable ride must principally be centred. Cars were mounted on practically the same trucks as was the case fifteen years ago, and although various devices were introduced in the hope of gaining flexibility and radial action, it must be admitted that a really comfortable riding truck was not yet an accomplished fact. The principle of the hand-brake showed practically no improvement, with its unpleasant jarring action. At Huddersfield an experiment was being made in the nature of a brake drum-keyed on to an extended armature shaft in the same way as the pinion, with a Ferodo-lined hand-brake operated in the usual way by means of the brake spindle. It was proving a great success. Advocating cross seats in the lower saloon, Mr. Robson said a 24-passenger cross-seat car held 24, whereas in a longitudinal-seated car the best conductor was often unable to induce 22 passengers to make room for 24. There was more comfort in the cross-seat, and the question of gauge was not an obstacle, as cross-seats had been successfully adopted at West Hartlepool. Now that rattan spring seatings were available, there was no reason why every bad joint, point and crossing should be accentuated by wooden seats. Adverting to ventilation, he remarked that successful experiments had been made with induced draught by means of a fan driven from the axle. An arrangement whereby a passenger might alight from the near side of the front platform would add to comfort, and also make the conductor's duties easier. It would be interesting to hear the experience of Newcastle and other places where experiments in this direction had been made. As an improvement on interior finish he advocated the contrast afforded by oak and mahogany, the use of rounded corners without mouldings and dust-traps, and the display in the end panels of photographs of attractive local scenery. In the top saloon there was much room for improvements. The outside canopy seats were often extremely uncomfortable. The extraordinary popularity of a toast-rack car at Southampton suggested that trailers on this principle would be a great asset for summer traffic. The war had given them a fine opportunity of getting rid of certain unnecessary stops, and it would be found that the travelling public as a whole were pleased. The sale of books of tickets had recently met with so much success in certain towns that the subject ought not to be ignored.

An hour was allowed for the discussion, after which omnibuses conveyed the members to the London General Omnibus Company's training school at Chelsea. Under the guidance of Mr. H. E. Blain, operating manager of the Omnibus Company and the Underground Railways, an inspection was made of the class-rooms, drivers' and conductors' courses, messroom, stores, and cinema hall. Films were exhibited with special reference to rules of the road for tramcars, omnibuses, and other traffic methods of training, etc. Tea having been served, Mr. Blain gave an address on "The Safety Movement."

The annual dinner took place in the evening at the Trocadero Restaurant, at which Viscount Chilston presided.

COMMERCIAL MOTOR IMPORT RULES.

The Board of Trade direct attention to a Proclamation, published in the *London Gazette* of June 27, by virtue of which the importation of commercial motor-cars and chassis, accessories and parts of such cars (other than tires) is prohibited as from July 6. Licences to import will be granted in cases where the goods were either en route for the United Kingdom or actually paid for at the date of the Proclamation. Licences will also be given where it can be shown that the importation is desirable in the national interests, or where the motor-car (being a commercial car) is urgently required for any of the purposes specified in Class A of the order of priority for the distribution of motor spirit (see p. 462, "Tramway and Railway World," June 8), or for agricultural purposes, or for the conveyance of essential goods. Licences will further be issued for the importation of spare parts for imported commercial vehicles which are already in the United Kingdom.

REPORTS RECEIVED.

Birmingham Corporation Tramways. Statement of accounts for year ended March 31, 1916 (Alfred Baker, tramways manager).

City and County of Kingston-upon-Hull. Tramways account for the year ended March 31, 1916 (J. McCombe, tramways manager).

County Borough of Burton-upon-Trent. Annual report of the Tramways Department, including statement of accounts for the year ended March 31, 1916 (A. B. Slater, tramways manager; Thomas Hall, borough electrical and tramways engineer).

County Borough of Eastbourne. Motor-omnibus accounts for the year ended March 31, 1916 (W. A. Sparrow, borough accountant; H. Burrell, acting borough accountant; P. Ellison, general manager).

City of Manchester. Annual report and abstract of accounts of the Tramways Department for the year ended March 31, 1916. (J. M. McElroy, general manager; F. A. Mitcheson, accountant.)

Stalybridge, Hyde, Mosley and Dukinfield Tramways and Electricity Board. Abstract of accounts to March 31, 1916. (R. Blackmore, engineer-in-chief; F. Schofield, commercial manager; E. Jagger, accountant.)

MISCELLANEOUS NEWS AND NOTES.

The South Coast Kearney High Speed Railway Company, Ltd., has been formed with a capital of £21,000.

Adelaide Tramwaymen in Service.—No fewer than 195 of the employees of the Adelaide Municipal Tramways have enlisted for active service.

A Suggested South Lancashire Extension.—A request for the extension of the tramways from Leigh to Astley and Boothstown has been submitted to the South Lancashire Tramways Company, in order to provide for the extension of coal mining in the Astley district.

Southend Economy Proposal.—A committee of Southend Corporation appointed to consider the question of effecting economies during the war, have reported against any reduction in the tramway service. They recommend, however, that the post of traffic superintendent should be abolished.

Increased Omnibus Fares at Newcastle.—Owing to the increased cost of petrol, the Newcastle Corporation Tramways Committee have decided to increase the fares on motor omnibuses. The increase will range from a halfpenny to a penny. Soldiers will be charged full fare on the omnibuses and children half fares, but no fare will be less than a penny.

West Ham Fares.—The Council have agreed to the changes in fares recommended by the manager, Mr. J. S. D. Moffet. There will be a universal penny fare—*i.e.*, a penny will be charged for any single journey on any car. All half-penny fares, except for children, will be abolished. Workmen's return fares will be 1½*d.* It is hoped that the new arrangement will put the tramway undertaking on a sound basis, and at the same time enable a convenient and adequate service to be maintained.

Women Conductors at Brighton.—Commenting in his annual report on the difficulty of filling the places of the men who have joined the Forces, Mr. W. Marsh, tramways engineer and manager, remarks that the only alternative was to employ women or to provide a wholly inadequate service. The employment of women saved the situation, and they had done much better than anyone anticipated. Accustomed to indoor life as the majority were, only about half of those who took up the work were able to continue, but those who could were much benefited by the healthy outdoor life.

Failure of Current at Birmingham.—Another stoppage of the Birmingham Corporation cars occurred at 9.40 on Saturday morning, June 24. It was due to the failure of the current, which was cut off for forty minutes. For some months past the electric supply department have been working at the highest pressure in order to meet the increased demand, and the margin available in the event of any failure of a part of the machinery is very small. On Saturday morning two or three of the boilers were out of service and the station was short of steam. A further difficulty is the fuel supply, which is at present of a low grade.

Troops at Colchester.—While the stationing of a larger number of troops at Colchester has improved the financial position of the tramways, their presence increases the difficulty of running the cars to schedule time. As Mr. Bullough, the general manager, remarks in his last report, the cars are almost daily delayed by the movement of troops. The difficulty of obtaining motormen has been acute, but the problem has been solved by the employment of women. Materials for repairs have also been difficult to obtain, the prices having advanced between 40 and 50 per cent. It is difficult, now, to get material at any price.

Sir R. Hadfield on Technical Training.—In replying on this subject, to some of his French friends, Sir R. Hadfield recently gave his opinion, as reported in the "Sheffield Daily Telegraph," that neither the scientific nor the practical man fulfils the required conditions in managing great business affairs. By a practical man is meant a man who has received a good secondary school training but no special scientific culture, and by a scientific man one who is a stranger to the necessity of practical training. It is necessary, therefore, to find a man who unites the various qualities. Non-success attends both the practical and the scientific man who fails to develop the higher qualities. A man needs above all his personal application and intuition.

Damages against Plymouth Corporation.—At the Devon Assizes on June 22 a jury returned a verdict for the plaintiff, with £250 damages, in an action brought by Mr. A. E. R. Penryn against Plymouth Corporation in relation to injuries received owing to the trolley arm of a tramcar leaving the wire and striking him on the head. For the plaintiff it was alleged that the Corporation were negligent in failing to provide a trolley catcher, such as was in use at Exeter. Mr. C. R. Everson, general manager at Plymouth, said the Exeter tramways were centre running, and the appliance was not effective for the side running method at Plymouth. Evidence for the Corporation was also given by Mr. J. B. Hamilton, general manager, Leeds, Mr. E. M. Munro, consulting engineer, London, and Mr. P. J. Baker, electrical engineer of Plymouth tramways.

Certified Occupations.—As the result of two conferences between a deputation from the Tramways and Light Railways Association and a Board of Trade Committee on Reserved Occupations, the Association has invited all its members in charge of generating stations to endeavour wherever possible to release men for the Services from the following occupations:—Meter readers, clerks (except chief clerks), assistant storekeepers, all cleaners employed in cleaning floors, walls, etc., in central stations, labourers (single men up to twenty-five or thirty years of age) employed on general labouring about a station, but excluding coal and ash handlers. The Committee have thanked the deputation and again urged that every effort be made to release men of military age, and that employment be given to discharged naval and military men, or to women.

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The London General Omnibus Company and the War Office.—In reply to a question by Mr. Ashley in the House of Commons on June 22, the Financial Secretary to the War Office said that since the outbreak of war the approximate payments made to the London General Omnibus Company to date had amounted to £750,000, of which £714,000 represented the cost of motor vehicles, bodies, spare parts, etc. Accounts awaiting payment amounted to £15,000.

A Difficulty in Steel Car Construction.—One of the hardest problems of steel car construction is the side sheathing. It is difficult to obtain sheet metal that is entirely free of buckles, and as a consequence after the sheathing is applied, considerable work must be done in straightening up the sheets. Expert sheet workers take the buckles out of the sheathing after it has been riveted. The process is a combination of heating at the proper places and then allowing the cooling to take place in varying degrees.—*Brill Magazine.*

Accidents in Handsworth and London.—A car belonging to the South Staffordshire Tramways Company left the rails and overturned near the railway bridge spanning the railway at Soho Road, Handsworth, on June 26. It is believed that a fractured brake-block was the cause of the accident, which caused injuries to nearly thirty persons. An accident that occurred to a car of the Metropolitan Electric Tramways Company, on June 27, at Cricklewood, would seem to denote the want of care on the part of motor-lorry drivers in passing from a side street into a main road. The tramcar was met by a lorry coming from Ashford Road. Although the motorman applied the brakes, there was a collision, which caused the car to leave the rails, run against the kerb and overturn. Of the twenty persons on the car the conductor was the most seriously injured. He sustained a fractured leg.

Penny Stages at Southampton now average about 2,500 yards. In explaining the new scheme of fares, which was alluded to in our issue of June 24, Alderman Dunsford, chairman of the Tramways Committee, made the following remark: "I am not keen on making a profit to go to the reduction of rates, but I am particularly keen that my balance sheet should be perfectly sound." The proposals of the manager, the alderman continued, were perfectly fair all round, and would meet the requirements of the travelling public. It was estimated that the changes might reduce the number of passengers paying halfpenny fares from twenty per cent. to ten per cent. of the total number of passengers. Alderman Kimber described the scheme as thoroughly business-like, and said he was grateful to the chairman and the manager for the proposal, which he regarded as a complete settlement that would do away with further fare revision for many years.

No Petrol Licence Duty on Trade and Hackney Carriages.—In connection with the issue of licences to restrict the use of petrol, and the imposition of an additional tax of 6*d.* per gallon, Mr. Montagu (Secretary to the Treasury) announced in the House of Commons on June 26 that the Government had intended to impose half duty on trade cars. Representations had been received by the Government, and although they proposed to issue licences, there would be no duty charged on the petrol for trade cars. Mr. Montagu moved a clause providing that a motor-car shall not as a hackney carriage be exempt from licence duty unless the car is used solely as a hackney carriage. The clause was agreed to. A clause entitling to relief from motor licences duty persons whose cars are used exclusively for any Government service was agreed to. On June 27, the House adopted a resolution, proposed by Mr. McKenna (Chancellor of the Exchequer), providing that motor-car owners, except the owners of commercial vehicles, should take out a licence authorising them to be supplied with petrol, upon which they should pay a duty of 6*d.* per gallon, qualified medical practitioners and registered veterinary surgeons to get licences at half rates.

PERSONAL.

Bombardier W. Bates, a Halifax tramcar conductor, has received the military medal for gallant conduct at the front. He was a reservist, and went to France at the outbreak of the war.

Corporal C. Angulatta, who was a conductor on the Cardiff Corporation Tramways, and joined the army in September, 1914, has been awarded the military medal for bravery whilst throwing bombs.

Lewis Q. Verlander, who was for eight years a conductor on the Brighton Corporation tramways before his enlistment, and is now second yeoman of signals in the Royal Naval Reserve, has been awarded the D.S.M.

Mr. A. B. Mountain, borough electrical engineer, Huddersfield, has resigned, but is to be retained as consulting engineer. Mr. J. W. Turner, who has been Mr. Mountain's chief assistant, has been appointed borough electrical engineer.

Mr. R. H. Wilkinson, general manager, Huddersfield Corporation Tramways, has had his salary increased from £400 to £500. Only five members of the Council voted for an amendment to reject the Tramways Committee's recommendation in favour of the increase.

Mr. William Marsh, general manager and engineer, Brighton Corporation Tramways, and the staff were highly complimented by Councillor Martin, chairman of the Tramways Committee, when he submitted to the Council the report on the past year's trading. The manager and the employees, observed the chairman, had carried on the undertaking in a highly creditable manner under abnormal conditions.

Motorman W. Middleton, South Shields Corporation Tramways, who was serving on a warship that took part in the battle off Jutland, has been presented with a silver watch and a silver cigarette-case by the employees and staff of the tramways department. Alderman W. G. Wylie, chairman of the Tramways Committee, in handing the gifts to the recipient, expressed the pride felt by all connected with the tramways in having a representative engaged in the fight.

Mr. C. W. Goodman, elder son of Mr. W. G. T. Goodman, chief engineer and general manager of the Adelaide Municipal Tramways, enlisted for active service immediately he had completed his engineering course at Adelaide University, where he was graduated with the degree of B.E. He is now a lieutenant in the Engineers, and was recently in command of the Engineers in camp, but he expects to go to the front shortly. Mr. R. G. Goodman, a younger son, a medical student, who went to Egypt last November in the A.M.C., has now been given a commission in the A.I.F., and is now in France.

Private A. A. Chattock, Royal Warwickshire Regiment, who was killed in France on June 4, was the only son of Mr. R. A. Chattock, city electrical engineer of Birmingham.

CONTRACTS AND ORDERS.

Southampton Council have placed a contract with Jenkins and Co. for a coal-breaker, at £147 15*s.*

The Motor Rail and Tramcar Company, Lombard Street, E.C., have supplied petrol tractors and parts to the War Department.

Wolseley Motors, Ltd., have supplied a number of motor-cars to the stores department of the India Office.

W. C. Yuille and Co. have received a contract for the supply of wall plug sockets, etc., for Glasgow Tramways Committee.

Clayton and Shuttleworth, Ltd., of Lincoln, have received a contract to supply a number of steam vehicles to the War Office.

Glasgow Council have accepted the offers of MacKinlay, Ltd., and R. M. Easdale and Co., for the purchase of scrap materials in the tramways department, and have placed a contract with Babcock and Wilcox, Ltd., for four sets of water-tube boilers, at £10,632.

FINANCIAL REPORTS AND MEETINGS.

Manchester Corporation Tramways.—The Tramways Committee on June 27 adopted the annual report presented by Mr. J. M. McElroy, the general manager. The revenue totalled £939,470, as against £901,876 for the preceding year, and £925,310 in 1913–14. Passengers numbered 209,000,000, an increase of 7,000,000. The working expenses were £585,224, as against £604,205, but the total expenditure was increased consequent on allowances amounting to £92,808 made to dependants of 2,174 employees who had joined the colours. After paying £100,000 in relief of the rates, it was only possible to pay £21,181 to the reserve, renewals and depreciation account, as against £99,000, which would have been provided in normal times. The department had paid over £1,000,000 in relief of the rates since 1902.

Lincoln Corporation Tramways.—This undertaking has benefited from the increased activity due to the war. The passenger receipts for the year ended March 31 aggregated £7,316, a total increase of £881. The gross profit was £3,156, which was sufficient to pay interest and sinking fund charges, and to transfer £1,000 to depreciation account, leaving a balance of £493. The receipts per car mile were also a record, being 11.94*d.*, as compared with 10.40*d.* the previous year. The electrical equipment, including repairs to the "G.B." system, amounted to £229, being an increase of £80. The year just completed was the tenth year of the agreement entered into with the "G.B." Surface Contact Company for guaranteed upkeep, and taking into consideration the cost of upkeep for the other years, the average cost is now brought up to £130, as against £90, i.e. £30 per mile of single track, the figure of the guarantee, or an increased cost of nearly 50 per cent. The extra cost this last year has been due to less favourable results obtained by the use of English carbons installed two years ago, as compared with the life obtained from the previous ones of French manufacture. Experiments have been made during the last twelve months with a modified type of carbon, and it is hoped to get better results. The city electrical and tramway engineer, Mr. Stanley Clegg, points out that the average working costs of 84 other municipal tramways working on the overhead system for the year 1915 are 6.087*d.* per car mile run, and the Lincoln figures are .107*d.* below this average.

Imperial Tramways Company.—The report for the year 1915 states that the gross receipts of the Middlesbrough, Stockton and Thornaby tramways amount to £66,529, as compared with £63,562 for the preceding year, an increase of £2,967. The number of passengers was 12,299,280, against 12,261,624, an increase of 37,656. The net profit is £15,432, as compared with £17,604 for the corresponding year. The traffic receipts have continued to develop in spite of the difficult conditions prevailing throughout the districts served by the tramways and omnibuses. Since the beginning of the war 84 per cent. of the employees have joined the Forces or attested. The special allowances granted to dependants of employees on active service amounted to £1,531. The Corris Railway Company shows a decrease in receipts of £428, almost wholly due to the absence of tourist traffic, but the working expenses have been further reduced, the decrease being £780. The Imperial Tramways Company holds 122,230 5 per cent. cumulative preference shares of £1 each and 112,451 ordinary shares of £1 each in the London and Suburban Traction Company, and has received the full dividend for the past year on the preference shares, but the revenue of that company for the year 1915 was not sufficient to permit the payment of any dividend on the ordinary capital. The company's

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net revenue account for the year shows an available balance of £25,760, and after payment of interest on the debenture stock for the whole year an interim dividend on the preference shares in respect of the half-year to June 30 last, amounting together to £17,075, it is proposed to appropriate the balance as follows:—Dividend at 6 per cent. per annum on the preference capital (less income tax) paid January 1 last £5,025; dividend for the year at 2 per cent. on the ordinary capital (less income tax) £3,467; carrying forward £194.

Birmingham and District Power and Traction Company.—At the annual meeting the chairman (Mr. C. S. B. Hilton) said the net revenue from tramways was £56,545, or £6,963 better than in the previous year, while interest and dividends on investments showed £7,179 increase. The entire revenue of £106,024 showed the substantial increase of £14,202, while on the expenses side there was very little increase. Too much importance, however, must not be attached to that small increase in expenses, as it had been impossible during the war to spend as much as is usual in repairs and maintenance. The final result was that, after making a provision of £9,000 for renewals, or £5,000 more than in 1914, placing £5,000 to reserve, as against £2,000, and providing the full 6 per cent. dividend on the preference shares to December 31, the company was able to pay an increased dividend of 1 per cent., or 4½ per cent. for the year on the 7 per cent. preferred ordinary shares, and to increase the carry forward by £1,591 to £2,551. In referring to the scheme for capital reduction, the chairman said that the experience of the past twelve years had shown that tramway undertakings operating on the modern low fare basis were incapable of carrying the burden of capital represented by displaced systems of traction. There was an insufficiency of profits. The directors proposed therefore to cancel £325,000 of deferred ordinary shares and to convert the remaining 25,000 deferred ordinary shares and the whole of the £350,000 preferred ordinary shares into ordinary shares. The British Electric Traction Company, which held all the deferred shares, would become entitled to participate at an earlier date to a small extent in such distribution of profits as in future might be made after payment of debenture charges and preference dividend. Alluding to the omnibus undertaking, the chairman remarked that it had for the first time paid a dividend on the ordinary shares, after making full provision for depreciation.

British Electric Traction Company.—The twentieth annual meeting was held on June 23, Mr. E. Garcke presiding. In moving the adoption of the report (a summary of which appeared in our issue of June 10) the chairman stated that of 11,000 of their employees in Great Britain over 3,300 joined the Forces before compulsory service was adopted, and 120 of them had made the highest sacrifice man could offer for his country. To some extent the vacancies had been filled by women, of whom nearly 2,000 were employed, and were giving complete satisfaction. Higher wages had had to be paid because of the war, and altogether the working expenses had increased considerably, but the company were not able to increase the fares and rates charged for electricity. If, therefore, they showed larger profits, it was because they had done much more work, for they had earned less per passenger and per unit. They were making no so-called war profits. An Act had been passed taxing heavily all profits made during the war in excess of those of a pre-war period. Tramway and electricity supply companies, if they were profitable, were taken over by local authorities on the expiration of specified periods, and the price paid was generally less than the capital expended. Therefore, those companies were bound to make large reserves out of profits, and it was only after the undertakings had been developed for several years that they were able to do that. A tax on profits in those cases was thus a tax on capital. The directors had suggested that the Act should give special protection to such companies, but the only concession they had been able to obtain was that those cases should receive special consideration. The revenue account showed a balance of profit of £209,000, or about £11,000 more than in the preceding year. After paying the debenture interest of £91,259 and the dividend of six per cent. for the year upon the cumulative participating preference stock, requiring £42,764, they had a balance of £75,146 besides the amount of £71,398 brought forward. Last year nothing was placed to reserve, but the directors thought that an addition of £20,327 to reserve, raising it to £410,000, was the right thing to do this year. Owing to the re-arrangement of capital they were able to pay a dividend of three per cent. on the new ordinary shares, and the carry-forward would be increased by £15,030 to £86,428.

Newcastle Chairman's Review of the Year. Councillor R. Mayne, chairman of the Tramways Committee, in presenting the annual statement of accounts to the Town Council, said that owing to the abnormal conditions the figures must of necessity show very different comparisons with those made in former years. The traffic expenses amounted to £93,831, an increase of £14,503, of which 87.40 per cent. was incurred in wages, the remainder being due to war bonuses. Uniforms had cost more owing to the employment of women conductors, the men they displaced having been already equipped during the year. General expenses amounted to £34,745, an increase of £9,165, of which £6,000 was due to the rates; the balance to third party claims and insurance against aircraft. Working expenses at £38,055 were £6,935 higher, mainly owing to the increased cost of maintenance of cars. Power expenses amounted to £17,430, an increase of £3,946, due entirely to the increased cost of fuel. The expenses for public lighting were £4,520, a decrease of £760, attributable to the new lamps that were gradually being installed. Owing, however, to the lighting restrictions this work had been temporarily suspended. The total working expenses were £192,049, an increase of £32,191. The total income was £324,605, an increase of £31,431. The gross profit at £132,046, compared with £132,805. Adding interest, there was a total of £135,764, as compared with £136,003. This sum will be disposed of as follows:—Special rents, etc., £1,697 (last year £1,559), income tax £10,834 (last year £5,412), interest and redemption of the loan capital of the undertaking £75,000 (last year £72,930), interest and redemption on old horse tramways £1,418 (last year £1,381), contribution to rates out of profits £8,164 (last year £18,000), purchase of motor omnibuses and other items £117 (last year £3,599), war service allowances to men on active service and to their dependents £13,144 (last year £4,365), claims reserve to £2,000 (last year £935), making a total of £112,375 (last year £111,181), leaving a net surplus to be appropriated towards the reserve and renewals funds of £23,389 (last year £24,822). The expenditure on renewals to permanent way, additions to plant and cables provided to meet the increased load due to the workmen's traffic, amounted to £16,643. The purchase of land at £4,400 brought the expenditure to £21,652. The whole of the surplus money was practically absorbed, with the exception of about £2,000 which would be carried to the reserve and renewals fund, raising it to £77,000. In the preceding year the renewals and reserve fund had been drawn upon to the extent of £19,682, while in the year under review they had fully covered all their outgoings out of income, which Councillor Mayne regarded as highly satisfactory. During the year they had paid £13,000 to the dependents of men on active service, £8,000 to the relief of rates, and the increased income tax had amounted to £5,000.

BUSINESS NOTES.

Messrs. Edward Le Bas and Company, of Dock House, Billiter Street, London, E.C., as sales agents for the Standard Underground Cable Company, of Pittsburg, and Hamilton, Canada, whom they have represented in this country for many years, request that their name should not be confused with that of the Standard Cable Manufacturing Company, London, a firm which has recently been put out of business owing to its being an enemy concern.

The Zenith Carburettor.—An important point about the Zenith carburettor is that, once set, it is not affected by climatic changes. A Weston-super-Mare motorist has just tested this under trying conditions. His outward journey to Oxford was accomplished through mud, rain, fog, hail, and wind. His consumption for the one hundred miles was exactly two gallons of No. 2 spirit. The return journey was made in much finer weather, although there were some storms, and the consumption worked out just under two gallons of No. 1 spirit. Allowing for the slight gravity difference in the spirit this makes the performance as nearly as possible equal, although one was with a heavy atmosphere and the other with a much more rarefied one.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of forty-five of the principal tramway undertakings in the United Kingdom for the week ended June 17, give total receipts of £109,486, or £22,812 more than in the corresponding week of last year. The total length of track included in the returns was 2,252 miles, or seventy more than for the corresponding week. The receipts this year were at the rate of £88 11*s.* 7*d.* per mile of single track, and last year at the rate of £80 19*s.* 4*d.*, thus showing an increase for the week of £7 12*s.* 3*d.* per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

DIVIDENDS. PREV.	DIVIDENDS. LAST.	NAME.	PAID.	PRICE, JULY 27th 1914	CASH. June 29.	A WEEK AGO.
5%	5%	Alabama Traction, 5% 1st. Mt.	—	67	67½	66
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4¾	73/1½xd	73/1½
4%	4%	Do. 4% Deb. ...	100	91	76½xd	76½
4½%	4½%	Do. 4½% Deb. ...	100	98½	76½xd	76
5%	5%	Do. 5% Deb. ...	100	96	77	77
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1⅜	18/3	18/3
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	96xd	95½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11½	10⅞	10⅞
4½%	4½%	Do. 4½% Deb.... ...	100	96	85⅞xd	85
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	97½	97½
$¼	$1	Brazilian Trac. & Power Ord. ...	$100	66	61½	63½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	94½	94
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6½	6½
2/6	2/6	Do. 5% Cum. Pref.	5	5	90/-	89/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92½xd	92
5%	5%	Brit. Col. Elec. Ry. Def. Ord....	100	107	39½	39½
6%	5%	Do. Pref. Ord....	100	106	40	40
5%	5%	Do. 5% Cum. Pref.	100	103	58½	58½
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	80½	80½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	64½	63½
—	—	Brit. Elec. Trac. Ord.	100	—	38¼xd	38½
—	—	Do. 6% Cum. Part Pref. ...	100	—	79½xd	80
5%	5%	Do. 5% Deb.	100	92	82	80
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	70½	70½
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	92½	92½
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	0½	0½
1/3	1/3	City of B.A. Trams.	5	5½	93/9	92/6
5/-	5/-	Dublin United Trys 6% Pref.	10	12	10½	10½
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½xd
—	—	La Plata Trams. Ord.	1	¾	2/1½	2/1½
5/6	6/-	Lanarkshire Trys. Co.	10	10½	9½	9½
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9½d.	9½d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	1⅛	2/6	2/6
6d.	6d.	Do. 5% Pref.	1	1/16	8/10½	8/9
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	58xd	55
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	90½xd	88½
5%	5%	Do. 5% Inc. Deb.	100	88½	80½	79½
4%	4%	Lon. Unt. Trns. 4% 1st Mt. Db.	100	55	48½xd	48½
3/-	3/-	Madras Elec. 6% Pref. ...	5	5⅛	96/3	96/3
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67½	67½
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	72	71½xd
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	80½xd	80½
$1½	$1½	Mexico Trams. Common ...	$100	70	27½	27½
5%	5%	Do. 1 Mt. 5% G.B.	—	84	40½	40½
6%	6%	Do. 6% Mt. Bds.	100	76	34½	34½
4½%	4½%	Montreal St.4½%Stg.Debs.(1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs.	100	99	92½	92½
1/2*	1/2½*	National Steam Car	1	½	16/-	16/-
9¾d.*	9¾d.*	New General Traction	1	¾	7/9	7/9xd
6d.	8½d.	Northern Gen. Trans. Ord. ...	1	⅞	16/-	16/-
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	61/3	61/3
5%	5%	Do. 5% 1st Deb.	100	89½	70½	70½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	83½	83½
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	⅝	10/4½	10/6
8d.	10d.	Provincial Trams. Ord.	1	¾	15/10½xd	16/-
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84	84
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	93½	93½
5%	5%	1st. Mt. 5% 50 yr.	100	89½	82½	82½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	90½	88
5%	5%	Do. 5% Perp. Deb.	100	99½	79½	78½
—	—	Singapore Elec. Trams	5/-	¾	2/9	2/9
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	94½	94½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs. ...	100	91	85	85
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	92½	92½
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	77	76
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	¾	8/6	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4½	85/-	85/-
		Metropolitan Dist. Ord. ...	100	21½	19½	19½
		Undgd. Elec. Rys. of London ...	10	2½	37/6	36/8
		Do. "A"	1/-	⅜	6/4½	6/6
		Do. 4½% Bds of 1933 Rd.	—	99	106	105½
		Do. 6% 1st Cum. In. Db.	100	114	107	106½
		Do. 6% In. Bonds Rd. ...	—	88	87½	86½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1915	1916	Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	June 24	£49,296	£48,580	26	£1,279,333 —	£5,200
Auckland.....(28 days)	May 5	20,447	21,202	44	231,906 +	4,308
Ballarat and Bendigo ...	Apr. 23	3,920	3,727	4	3,727 —	193
Brazilian Traction Mlrs.	May	6,670,110	7,091,000	22	32,989,000 +	1,896,830
Brisbane	Apr.	29,890	32,575	18	129,450 +	12,610
British Columbia.....$	Apr.	540,861	549,046	43	5,531,193 —	764,709
Buenos Aires Lacroze ...	May 11	44,480	41,503	48	454,605 —	11,116
Burmah Tramway ... Rs.	June 24	4,224	3,718	47	... +	5,944
Calcutta.....Rs.	„ 24	66,574	66,443	26	1,674,594 +	85,028
Cape Town	Mar.	...	14,994	...	...	...
Carthagena & Herrerias..	May	1,931	2,927	22	12,857 +	4,268
Cordoba	Mar.	12,746	13,598	52	161,906 +	6,251
East India	May	2,119	2,161	43	20,867 +	1,508
Hong Kong .....$	May 20	10,312	14,937	23	269,764 +	58,040
Kalgoorlie	March	2,638	2,479	13	6,963 —	399
La Plata	May	4,489	4,343	22	22,189 +	301
Lima	Apr.	31,623	33,556	18	134,629 +	5,614
Lisbon .....Escu.	Apr.	...	190,051	18	712,651	...
Madras .....(2 weeks)	June 15	27,340	30,277	23	341,092 +	27,437
Manila .....$	Apr.	117,450	124,350	...	505,381 +	16,765
Manaos .....Rs.	March	...	157,156	...	...	...
Melbourne	Apr.	...	69,542	...	...	...
Montevideo	May	27,771	28,349	30	215,768 +	13,342
Peruvian .....$	May	737,166	826,900	48	8,833,997 +	1,233,666
Port Elizabeth	Mar.	...	3,857	...	...	...
Rangoon	May	4,887	4,589	22	24,376 —	372
Shanghai .....$	May 24	25,706	28,048	...	...	...
Singapore .....$	May 20	11,242	13,139	20	247,259 +	29,716
Toronto.....$	Apr.	795,816	883,209	18	3,546,784 +	319,541
Winnipeg	Apr.	264,856	282,498	18	1,169,808 —	63,597

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	1916	Incr. or Dec.	Wks.	Aggregate. 1916	Incr. or Dec.
Aberdare	June 20	£331	£390	+ 59	12	£4,428	+ £246
Aberdeen Corporation...	„ 21	1,832	1,840	+ 8	3	5,680	— 276
Accrington Corp.....	„ 21	559	639	+ 80	12	7,001	+ 232
Ayr Corporation	„ 24	407	462	+ 55	6	2,151	+ 45
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.....	„ 25	1,385	1,598	+ 213	12½	18,327	+ 1,336
Birmingham Corp.	„ 24	13,281	16,250	+ 2,969	12	198,620	+ 35,251
Do. Motor Omnibuses	„ 24	898	1,007	+ 109	12	11,331	+ 1,088
Blackburn Corp.	„ 21	1,352	1,345	— 7	12½	16,256	— 497
Blackpool & Fleetwood.	„ 24	681	1,025	+ 344	25	12,539	+ 924
Blackpool Corp.	„ 22	1,214	2,293	+ 1,079	12	17,459	+ 2,329
Bolton Corporation.....	„ 25	2,741	2,957	+ 216	13	35,816	+ 2,433
Bournemouth Corp.....	„ 19	1,953	2,216	+ 263	13	28,280	+ 695
Bradford Corporation ...	„ 24	6,381	6,725	+ 344	12	82,850	— 340
Brighton Corporation ...	„ 25	1,121	1,230	+ 109	12½	14,054	+ 788
Bristol	„ 23	9,802	10,541	+ 739	25	238,932	+ 8,855
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	„ 17	1,528	2,057	+ 529	12	20,797	— 919
Burton-on-Trent Corp...	„ 25	281	264	— 17	12	3,179	— 403
Bury Corporation.....	„ 25	1,358	1,561	+ 203	13½	18,159	+ 556
Cardiff Corporation.....	„ 3	2,644	2,852	+ 208	9	26,359	+ 1,090
Chatham & District.....	„ 22	1,208	1,334	+ 126	25	28,213	+ 1,163
Chesterfield Corp.	„ 15	263	298	+ 35	11	3,051	+ 112
Colne Corporation	„ 24	234	264	+ 30	...	...	...
Cork Electric	„ 22	559	585	+ 26	25	11,849	— 225
Croydon Corporation ...	Apr. 28	1,726	1,403	— 323	4	5,417	— 666
Derby Corporation	June 27	1,046	1,134	+ 88	12½	13,698	+ 565
Dover Corporation	„ 24	317	318	+ 1	12	3,740	— 2
Dublin & Lucan	„ 23	183	190	+ 7	25	3,208	— 375
Dublin United	„ 16	6,643	6,558	— 85	24	131,508	— 9,878
Dundee City	„ 21	1,367	1,398	+ 31	5½	7,360	+ 179
East Ham Corporation	„ 24	1,356	1,367	+ 11	12½	15,967	— 194
Exeter Corporation.....	„ 23	387	396	+ 9	12	4,534	— 144
Glasgow Corporation	„ 24	21,998	24,389	+ 2,391	3½	84,129	+ 6,413
Glasgow Subway.....	„ 24	1,020	1,054	+ 34	25	30,043	+ 3,085
Glossop (U. Elec. Supp.)	„ 24	129	139	+ 10	26	3,474	+ 410
Halifax Corporation.....	„ 20	2,288	2,353	+ 65	11½	26,379	— 499
Do. Motor Omnibuses	„ 20	49	49	nil	11½	541	— 65
Hastings & District.....	„ 23	1,010	1,038	+ 28	25	21,315	+ 301
Huddersfield Corp.	„ 24	2,640	2,810	+ 170	12	35,726	+ 2,940
Hull Corporation	„ 24	2,920	3,163	+ 243	12	37,542	— 773
Ilford U.D.C.	„ 24	675	690	+ 15	12	8,394	+ 430
Ilkeston Corporation ...	„ 28	135	140	+ 5	13	1,743	+ 66
Ipswich Corporation	„ 24	607	601	— 6	12	6,366	+ 233
Isle of Thanet	„ 24	432	366	— 66	38	10,471	— 1,955
Kilmarnock Corp.	„ 24	176	188	+ 12	5½	964	— 50
Lanarkshire	„ 22	2,109	2,574	+ 465	25	54,969	+ 8,807
Lancashire United	„ 21	1,830	2,111	+ 281	25	42,493	+ 1,539
Leeds City.....	„ 24	8,875	9,832	+ 957	13	118,415	+ 8,975
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	„ 24	795	882	+ 87	5½	4,934	+ 369
Leyton U.D.C.....	„ 22	1,683	1,749	+ 66	12	19,590	— 33
Liverpool Corporation...	„ 24	13,776	14,468	+ 692	25½	341,788	+ 14,924
Llandudno & Colwyn B.	„ 23	267	448	+ 181	20½	7,438	— 367
London County Council	May 24	12,610	49,920	+37,310	7½	365,415	+ 46,678
London Genl. Omnibus	*	...	...	...	...	...	...
London United.....	*	...	...	...	...	...	...
Lowestoft Corporation...	June 10	188	132	— 56	35½	4,642	— 1,379
Maidstone Corporation..	„ 22	204	203	— 1	12	2,568	— 76
Manchester Corp.....	„ 24	18,317	19,339	+ 1,022	12	228,607	+ 8,704
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	„ 24	177	203	+ 26	12½	2,665	+ 257
N'castle-on-Tyne Corp.	„ 24	6,564	6,824	+ 260	12	77,346	+ 1,856
Newport (Mon.) Corp....	„ 24	843	897	+ 54	12	11,104	+ 672
New St. Helens & Dist.	„ 21	1,069	1,126	+ 57	51	50,896	+ 2,774
Northampton Corp.....	„ 23	779	665	— 114	12	8,332	— 1,007
Nottingham Corp.....	„ 22	3,783	3,896	+ 113	12	45,409	+ 1,115
Oldham Corporation ...	„ 25	2,338	2,591	+ 252	13	33,280	+ 1,793
Portsmouth Corp.....	„ 24	2,707	2,727	+ 20	13	32,631	...
Preston Corporation.....	„ 21	943	1,037	+ 94	11½	12,771	+ 1,353
Provincial	„ 24	2,461	2,468	+ 7	38	81,812	+ 4,151
Reading Corporation.....	„ 22	811	826	+ 15	11½	9,623	+ 359
Rhondda Tramways.....	„ 8	1,160	1,192	+ 32	23	27,475	+ 1,132
Rochdale Corporation...	„ 24	1,677	1,924	+ 247	12½	22,456	+ 561
Rotherham Corp.....	„ 28	1,126	1,573	+ 447	12½	18,275	+ 4,012
Salford Corporation.....	„ 26	5,398	5,575	+ 177	12½	68,504	+ 2,908
Sheffield Corporation....	„ 25	8,680	10,685	+ 2,005	13½	134,806	+ 22,120
Southampton Corp.....	„ 21	1,479	1,712	+ 233	11½	18,446	+ 1,049
Southend-on-Sea Corp...	„ 28	737	895	+ 158	13	10,217	— 310
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.....	„ 17	888	809	— 79	11½	8,843	+ 180
Sunderland Corp.....	„ 25	1,504	1,618	+ 114	12	19,130	+ 697
Sunderland District...	„ 21	588	606	+ 18	34	19,655	+ 4,025
Swindon Corporation ...	„ 22	206	206	nil	11½	2,335	+ 7
Torquay Tramways.....	„ 15	554	655	+ 101	24	11,638	— 17
Tyneside Trys. & Tmrds.	„ 14	808	620	— 188	24	12,675	— 839
Wallasey Corporation ...	„ 24	1,283	1,417	+ 133	12½	16,131	+ 324
Walsall Corporation.....	„ 24	765	798	+ 33	26	20,120	+ 2,381
Walthamstow U.D.C....	„ 24	1,037	1,106	+ 69	12	12,915	+ 1,608
Warrington Corp.....	„ 15	461	491	+ 30	11	5,252	+ 407
West Ham Corporation	„ 22	3,183	3,306	+ 123	11½	38,664	+ 1,563
Wigan Corporation	„ 22	1,521	1,654	+ 133	12	19,832	+ 1,203
Wolverhampton Corp....	„ 28	1,089	1,198	+ 108	13	15,478	+ 1,388
Yorkshire (W. Riding)...	„ 25	1,567	1,718	+ 151	26	43,749	+ 3,747

* Issue of Traffic Returns suspended during the War.

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THE

Tramway & Railway World

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

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SAM FAY, General Manager.

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Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

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SATURDAY, JULY 8, 1916.

WAGES AND FARES AT CROYDON.

Following the strike which began on April 11th and had since almost wholly collapsed, the Croydon Corporation on Monday received a report from the Tramways Committee, who recommended increases in wages, and payments for overtime at an estimated cost of £1,865 a year. The Committee pointed out that on the working for the year ended March 31, the surplus, if any, would be small, for the cost of electricity had increased by £2,893, war allowances had absorbed £4,981, and war bonuses £925. Between the absence of a surplus and the great advance in the prices of stores and materials, the Committee notified that the proposed improved conditions for employees would not be possible without an appreciable increase of revenue. They, therefore, recommended a revision of the fare stages by shortening. This would reduce the penny distances from an average of 2 miles 290 yards to 1 mile 1,416 yards, and others accordingly. Practically 90 per cent. of the passengers using the Croydon cars pay penny fares. If the new fares gave an increase of 6 per cent. in the revenue it would mean £5,604, 8 per cent. £7,472, or 10 per cent. £9,340. The middle figure of 8 per cent. would, it was hoped, meet the new conditions recommended, cover the increased cost of materials, and leave some balance to place to the reserve and renewals fund. Concerning the strike, the Committee reported that between April 11 and June 9 the traffic receipts were £11,507, or a decrease of £3,262 on the corresponding period of last year, after allowing for the Whitsun holiday traffic which came in the 1915 period but not in that of 1916. Decreased wages and current consumption represented £3,124, leaving a net decrease of £138. Since the cars run averaged 41 per cent. fewer, the Committee regarded the saving in materials and in the wear of working parts as counterbalancing the £138, so that (quoting the report) "there cannot be said to be any loss from the working of the services since the commencement of the strike." The Committee pointed out that it was a question of getting only eight more motormen to attain normal conditions again. They thanked the seven voluntary workers, including members of the Council, who had driven cars, and they recommended that £350 be distributed among the motormen and conductors who remained at work, and the inspectors and other members of the staff. The Council are to be congratulated upon possessing a committee and manager who have brought the undertaking so successfully through a period of very great difficulty, and whose plan for granting certain concessions to employees has the merit of preserving financial stability. The recommendations do not meet with the approval of certain councillors, who would prefer to see the undertaking involved in disaster by conceding the extortionate demands of the strikers. We hope, however, that when the report comes up for decisive action at the next meeting the majority will preserve the common-sense attitude that has characterised the Corporation throughout the trouble. With the shortening of the penny stage the passengers will still be liberally treated, and there is no reason why they should not bear a contribution to increased working costs, just as consumers of any other commodity have had to do during the past twelve months. Alderman Allen, the chairman of the committee, was able to announce that the London General Omnibus Company had agreed to fall into line with the revised fares. The company's attitude should assist in convincing the Council of the wisdom of the recommendations.

THE PROBLEM OF MOTORMEN.

Mr. T. R. Whitehead, general manager, Coventry Corporation Tramways, appeared before the local Tribunal on June 20 to support claims for the exemption of employees. The Advisory Committee reported that the service could not be maintained with a smaller staff, but recommended that serious attention be given to the advisability of curtailing the service. It appeared that the employees of military age comprised 15 single men and 74 married men. Mr. Whitehead said the department would be only too glad to use older men if they could be obtained. Three men who had been sent by the recruiting officer were being trained. The department was not claiming for three young drivers whose exemption had been cancelled. Questioned as to the possibility of reducing the service, Mr. Whitehead said that fifteen gentlemen had come forward in the early morning to run cars, and if it were not for this assistance a very large number of munition workers would have to walk, and the same thing applied in the evening. The department had had to do some scheming to keep the service maintained that they now had. The Tribunal referred the list to the military representative for further consideration.

At Brighton, Mr. W. Marsh, the tramways manager, has issued an appeal for two dozen men to be trained as motormen, either for whole or part time.

Reading Corporation Tramways Committee have arranged with the military representative at the Local Tribunal to release all motormen under 27 years of age for military service. Of the pre-war staff of 200 men 60 per cent. had enlisted, and of the 84 remaining 47 are now being released for service.

Having failed to find suitable men of non-military age to be trained as motormen, Mr. C. Furness, general manager at Blackpool, has been instructed to apply for the exemption of a dozen drivers for the remainder of the season.

A Bristol motorman applied for exemption from military service on conscientious grounds. He declined to undertake work of national importance, and was ordered to enter the non-combatant service.

FINANCES OF OVERSEAS CONTRACTS.

The President of the Board of Trade has appointed a committee to consider the best means of meeting the needs of British firms after the war as regards financial facilities for trade, particularly with reference to the financing of large overseas contracts, and to prepare a detailed scheme for that purpose. The committee will consist of: Lord Faringdon (chairman), Mr. B. P. Blackett, Sir W. H. Clark, Mr. F. Dudley Docker, Mr. Gaspard Farrer, Mr. W. H. N. Goschen, Mr. F. Huth Jackson, Mr. Walter Leaf, Hon. Algernon Mills, Mr. J. H. Simpson, and Mr. R. Vassar Smith. Mr. Hartley Withers will act as secretary to the committee.

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SAFETY TRAINING IN LONDON.

The promotion of the Safety First Movement is abundantly justified, both from the points of view of traction operators and of the general public. This was shown by Mr. H. E. Blain, operating manager of the London General Omnibus Company, in the address on the Safety Movement delivered by him on the occasion of the visit of the Tramways and Light Railways Association to the company's training school at Chelsea on June 30. Mr. Blain mentioned that the omnibus company had sent 5,500 men to serve their King and country, and of the present staff of 3,500 drivers fifty per cent. had been trained since the outbreak of the war. He had just completed his third year with the company, and among other things that then gave him cause for surprise was the enormous compensation necessitated by the number of accidents. During those three years the claims and payments had been reduced 50 per cent. Since 1910 the total number of accidents had been reduced by 68 per cent., and that figure was a constantly improving one in each of the three years, being now only 2.15 accidents per 10,000 miles run by the whole fleet. The company had intended in 1914 to begin a Safety First Campaign, but it was prevented by the war. Since the darkening of the streets, special attention had been paid to the matter, and by advertisements they had been directing the attention of the public to the necessity of exercising greater care. The Safety Campaign originated in America, where a gold medal was annually given to the traction company most prominent in the movement. Last year the Boston Elevated Railway was awarded the medal. That company spent £1,500 on the campaign and reduced their accidents by 25 per cent. The London General Omnibus Company had beaten that record without beginning officially the Safety Campaign. They had found the cinematograph of great importance in training the drivers and conductors, both in efficiency and safety methods, and he could recommend any manager to adopt similar means. The various causes of accidents with omnibuses and tramcars were depicted by the films, which are to be loaned to cinema theatres. That week the company had distributed over a quarter of million safety pamphlets in the elementary schools. One hundred and twenty-three lives had been saved by the rear wheel guard, which had been made compulsory, and the company had now submitted to the police a guard for each front wheel. The film displayed by Instructor Saidge greatly interested the assembly, and on the motion of Mr. R. J. Howley, a vote of thanks was accorded to Mr. Blain

L.C.C. TRAMWAY MATTERS.

At a meeting of the Council on Tuesday last, it was reported that a person had been fined 10s. for a breakdown of a defective vehicle on the tramway track. It was reported also that F. G. Seager had been sentenced at Tower Bridge Police Court to three months' hard labour for attempting to obtain money from the Council by false pretences in connection with a tramway accident.

SUPERINTENDENT OF CENTRAL CAR REPAIR DEPOT.

Mr. G. W. Knight, who was appointed on the tramway permanent way staff in January, 1914, and who occupies the responsible position of superintendent of the repair depot and among other duties has the supervision of a staff of 750 employees, has been in receipt of a salary of only £300 a year. The Highways Committee stated that they proposed to consider the question of Mr. Knight's salary after the war. Its inadequacy is accentuated at the present time owing to the special work which Mr. Knight is performing for the Government, and the Committee consider that his services should meanwhile receive some recognition. They accordingly recommended that a grant of £50 should be made. The Finance Committee, reporting on the proposal, said that the Council had acted on the principle that increases of salary other than scale increases and special-duty pay should not be given during the war to members of the administrative staff. In this case, however, the Committee regard the conditions as so exceptional as to differentiate it from all others.

TRAVELLING AND SUBSISTENCE ALLOWANCES.

The General Purposes Committee, reporting on the subject of travelling and subsistence allowances, expressed the opinion that the rates allowed by the Council did not leave much room for reduction, but they have given instructions that during the continuance of the war cab fares shall be allowed only in very special circumstances and that expenditure under this head shall be kept as low as possible. At present first-class railway fares are allowed to assistants in receipt of salaries of £600 a year and upwards; other officers are allowed, unless otherwise directed by the head of the department, second-class fares when travelling in and around London, and third-class when on long journeys. The Committee had decided that third-class fares only should be allowed to all officers and employees except where the exigencies of the service rather than the convenience of the officer render it desirable that they should travel first or second class.

The foregoing reports were adopted.

It was stated that the tramway estimates for the current year would be presented at the next meeting.

WOMEN CONDUCTORS AND SEATS.

Mr. J. D. GILBERT, M.P., asked if the attention of the Highways Committee had been called to the proposal of the London omnibus companies to provide seats for their women conductors, and if the Committee proposed to make similar provision on the tramcars.

Mr. G. H. HUME (Chairman of the Committee) replied that the matter would come before the Highways Committee at their meeting on the Thursday following.

TRAMWAY TRACKS IN WAR TIME.

In a report presented to Middlesex County Council, their surveyor states that in parts the tracks of the London United Tramways Company "are in a deplorable condition." The report adds:—"In several places the joints of the rails have given way, whilst in others portions of the rails are missing, and the track paving is below the surface level of the roads. I have called the attention of the representatives of those areas, which are directly concerned, to the matter, who have informed me that owing to the war it is impossible for the Tramways Company to proceed with a complete renewal of the tracks, owing to their inability to obtain new rails. I have pointed out to the district authorities their obligations under Section 11 of the Local Government Act, 1888, and that, as they are responsible for the satisfactory state of the roads from fence to fence, it is imperatively necessary that some steps should be taken in connection with the said tramways as soon as possible. I should be justified in withholding my certificates for the annual maintenance of the roads affected, but as there are such abnormal conditions prevailing I propose to issue them this year in the usual way. In High Street, Brentford, there are many places along the track which require relaying."

Brentford Council have called the attention of the Board of Trade and the Commissioner of Police to the noise made by tramcars owing to the worn out condition of the tracks.

Bentley Council, who have complained of the dangerous condition of the track in that town, have been informed by Doncaster Corporation that for a distance of 300 yards it is proposed to put in a new foundation upon the present one. With regard to the raising of the rails in Bentley Road by the placing of iron girders underneath, the local council have expressed the opinion that that is an unsatisfactory way of dealing with the trouble.

A county court jury have awarded £15 damages against West Ham Corporation to a motor omnibus driver, who sustained injuries through tripping over a tramway rail at a place where the wood paving had sunk two or three inches. The scene of the accident is opposite the L.G.O. garage, and for the defence Mr. Caruthers, engineer to the Corporation, said the trouble was caused by the track made by omnibuses coming out of the garage. The line was being kept in ordinary repair. He did not find any hole.

WOMEN'S EMPLOYMENT AFTER THE WAR.

The Board of Trade Advisory Committee on Women's War Employment (Industrial), in a pamphlet issued for the use of their local committees, urge that difficult questions, such as the reinstatement of enlisted men after the war, the limitation of the new employment of women to the duration of the present emergency, and the like, should not be deferred, but faced immediately and settled by the employers and the workers at once.

At the congress of the Tramways and Light Railways Association on June 30, the Hon. Arthur Stanley, chairman of the Council, expressed the opinion that women would not generally be suitable as drivers. Several speakers observed that if women were to take the places of motormen who are being called to the colours, the cars should be equipped with air brakes.

Testimony was given at the congress to the endurance of the young women, over a thousand in number, now working as conductors on motor omnibuses of the L.G.O. Company. Mr. H. E. Blain, the operating superintendent, stated that only 37 had had to give up the work, from which the remainder appeared to derive physical benefit, judging by the number of instances in which larger size uniforms were soon required.

MISCELLANEOUS NEWS AND NOTES.

The London United Tramways Company on June 24 conveyed 1,500 children from London schools to Hampton Court for their annual outing.

Nottingham Lifeguards.—During the month of June six children were safely picked up by the lifeguards fitted to the Nottingham tramcars.

Expectorating from Cars.—Glasgow Tramways Committee have recommended the City Council to adopt a by-law making it an offence for a person to spit from a tramcar.

Hand Pliers for Cancellation.—East Ham Tramways Committee have abolished exchange tickets in consequence of the increased cost of tickets. Hand pliers are provided for the cancellation of the return ticket.

New Turbine for Cardiff.—An application has been made to the Local Government Board by Cardiff Tramways and Electricity Committee for sanction to a loan to defray the cost of a new turbine required at the generating station.

Controlled Establishments.—At the end of June there were 3,916 establishments and works under the control of the Ministry of Munitions. Aberdeen Tramways Department has been brought under the Munitions of War Act, 1916.

Extension of Plant.—Stalybridge, Hyde, Dukinfield and Mossley Tramways and Electricity Board have received sanction to borrow £30,000 for extensions of plant at the generating station. The work is to be put in hand as soon as possible.

Bexley Through Running.—On the application of Messrs. Balfour, Beatty and Company, Bexley Council have agreed to Mr. J. M. McElroy acting as arbitrator in the revision of the through running of the tramcars between Bexley and Crayford.

Tramway Traffic to the Royal Agricultural Show.—Visitors to Manchester on the occasion of the Royal Agricultural Show on July 1 and 2 have spoken highly of the tramway arrangements. There was an increase of nearly £2,000 in the week's receipts.

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Rail Renewal at Darwen.—Mr. F. J. S. Hoskins, general manager and engineer, Darwen Corporation Tramways, has borrowed from the Blackburn Tramways Department their apparatus for cutting away defective rail joints, replacing them in short lengths which are secured by bolted plates.

A West Ham Doubling.—A loan of £1,000 has been applied for to defray the cost of doubling the track at Connaught Road terminus. The Board of Trade having asked whether the scheme could not be postponed, the Tramways Committee have replied that the heavy traffic from the docks and arsenal renders the completion of the work a matter of urgency.

Liverpool's Increased Traffic.—From January 1 to June 24, notwithstanding the reduced number of tramway employees, the passengers carried by the Corporation tramcars totalled 73,358,533, an increase of 2,334,862 over the same period of last year. The receipts amount to £341,862, as compared with £326,863, while the car mileage was reduced by 53,270 to 6,113,547.

State Regulation of Coal Contracts.—In an Order in Council issued on June 29, power is given to the Admiralty, Army Council, Minister of Munitions, or any person authorised by them to give directions as to the priority to be given in the execution of orders or contracts for the supply of coal or coke. The necessity of complying with such directions will be held as a good defence for non-fulfilment of any contract.

Manchester Congestion Problem.—The special committee of Manchester Corporation appointed to investigate and report upon the problem of street traffic congestion, on July 3 considered a proposal that the tramways should not remain in the main streets of the centre of the city. Three years have elapsed since Mr. J. M. McElroy presented a report on the results of his investigation of similar problems in Europe and America.

Coal Supply.—The secretary of the Board of Trade on June 29 received a deputation representing gas and electricity undertakings, and including Mr. R. A. Chattock, city electrical engineer of Birmingham, and Mr. C. P. Sparks, president of the Institution of Electrical Engineers. Their object was to represent the difficulty of obtaining coal and in making new contracts at suitable prices. Mr. Marwood replied that the Board were prepared, if approached, to use their influence with the District Coal Committees and also to see that the prices were justified by the Price of Coal (Limitation) Act.

London Post Office Railway. It was stated in the Parliamentary papers issued on June 28 that the construction of an electric railway for the Post Office in London is nearly completed, though the work has had to be slowed down for lack of labour. The contract was placed with Messrs Mowlem and Company, in October, 1914. As already stated in our columns, the railway is for the conveyance of mails and parcels between Paddington station and district office, Bloomsbury district office, Mount Pleasant office, the G.P.O., Liverpool Street station, and the Whitechapel office, a distance of about six and a half miles. The railway is of two-feet gauge, and the trains will be worked without drivers. There are two tracks in a nine-feet tunnel, but at stations there are two tunnels. The lowest depth is thirty-seven feet, the minimum being twenty-eight feet.

Rewards to Motormen.—Rewards of one guinea have been awarded by Birmingham Tramways Committee to Motormen Hall and Whitehead for the respective actions of stopping a runaway horse and preventing a collision between a tramcar and a brewery vehicle. At Bradford, Motorman Holdsworth has been presented with a five-pound note by the Tramways Committee and complimented upon his pluck. When in charge of a fully-loaded car he applied the electric brake so quickly, to save the life of a child who had run in front, that a short circuit was caused. The woodwork of the car was ignited, and although he was badly burned the motorman remained at his post and applied the mechanical brakes, thus preventing the car from running backwards.

Publication of Tramway Receipts.—An "Indignant Ratepayer" complains in a Glasgow newspaper of the publication of tramway receipts, as the employees are not slow to take advantage of the situation by making repeated claims for advances in wages. Only a few months ago wages were advanced by 2s. a week, and now an additional claim is being made for a further advance. "Indignant Ratepayer" desires to know where all this is going to lead. Advances have been granted in all the Corporation departments, and the policy of squeezing has benefited a privileged class at the ratepayers' expense. At a meeting of Leicester Corporation, Alderman Flint, chairman of the Tramways Committee, said he was told that people had given him the credit for what was termed the wicked move of discontinuing publication of the tramway receipts. At one of the meetings the accounts were under discussion, and it was suggested that the figures published up to that time were misleading. It was, therefore, decided to discontinue for a time the publication of the figures. If the Council thought otherwise the Committee were prepared to carry out their wishes.

Metropolitan Association of Electric Tramway Managers.—The members of the Metropolitan Electric Tramway Managers Association and a number of their friends made a very enjoyable visit to Southampton on Wednesday, and under the guidance of Mr. W. T. Robson, the general manager of Southampton Corporation Tramways, inspected the car depot and repairing shops. On arrival the party was met by Mr. Robson and conveyed in special cars to the pleasant and roomy offices of the tramway department. Here Alderman F. A. Dunsford, the chairman of the Tramways Committee, welcomed the visitors who were subsequently entertained to luncheon at the South-Western Hotel by the Mayor, Alderman W. J. Dacombe, who presided. In expressing his pleasure at receiving the Association, the Mayor paid a cordial compliment to Mr. Robson, who he said had been with them for a year and had made his presence felt in a way which was highly beneficial to the tramway undertaking and the public. The Council had recently accepted his advice in regard to a re-arrangement of fares which he believed would have great advantages, and he had no doubt that other recommendations of the manager would be willingly accepted by the Committee. After luncheon special cars conveyed the party to the pier, from which in brilliant weather a trip was made across the Solent to Portsmouth. On returning, a short tour was made over a portion of the tramways and an hour was spent at the car sheds, the excellent equipment of which was, perhaps, a surprise to those who had not kept in touch with the progress of the undertaking. Of special interest were the Edison electric-tower wagon, and an electric permanent-way tip wagon that has replaced five horses. A charging and welding plant installed in a car was also examined with interest. Later the party visited the Pirelli General Cable Works, where they were received by Mr. H. Bevis, the managing director. The visit, though necessarily a hurried one, was of much interest. It was concluded just in time to enable the party to return to Waterloo by the eight o'clock train.

PERSONAL.

Mr. W. H. Allen has resigned the appointment of engineer and manager of Loughborough Corporation electricity department, and has accepted a position elsewhere.

Mr. C. L. E. Stewart, general manager of Rawtenstall Corporation Tramways, and borough electrical engineer, has been laid aside by illness, but is now on the way to recovery.

Mr. J. H. Balfour Browne, K.C., on his retirement from the Parliamentary Bar, has been elected a director of the Trafford Park Company and Railway. He has also joined the Board of the Trafford Park Estates, Limited.

Mr. W. T. Stevenson, of the Pernambuco Tramways Company is at home on a short visit. It is three years since Mr. Stevenson left London to take up the position of superintendent of the Company's rolling stock. This now consists of 140 cars and, in the present circumstances, maintenance has been no easy matter in view of the scarcity of supplies. Mr. Stevenson is paying a round of visits to his friends in various parts of the country and will return in a few weeks to Pernambuco.

Mr. W. L. Hitchens, chairman of Cammell, Laird & Co., in the course of a lecture at the National Economy Exhibition remarked that, whereas in the United States it was permissible to write off machinery in five or ten years, our antiquated income tax regulations did not allow this to be done inside of twenty years. Our use of old machinery was partly responsible for America before the war producing two and a half times more per head than this country did. A final settlement of the misunderstandings between labour and capital should be sought by means of a commission of investigation.

Sergeant E. Mann, King's Royal Rifles, who has been for ten years in the employ of Manchester Corporation Tramways Committee, has compiled an enviable record while serving in France. On July 2 he attended at the Hyde Road car depôt and was presented with the D.C.M., which was awarded to him for rescuing wounded comrades and holding wire entanglements against the enemy on two occasions. He has been thrice mentioned in despatches. Alderman Bowes, chairman of the Tramways Committee, handed the medal to the recipient, and the chairman's compliments were echoed by Aldermen Chapman and Pogson, Councillor Day, and Mr. McElroy, the general manager.

British Electric Traction Personnel.—Mr. E. Garcke, chairman of the company, at the annual meeting said it was impossible to mention all the officers of this and of the associated companies to whom acknowledgments were due, but there were two officers he could mention because, in addition to the high qualities they possessed, they were representative of the others, and it afforded him genuine pleasure to take this opportunity of thanking Messrs. C. H. Dade and R. J. Howley, the joint managers, and all the other officers they represented, for the excellent services they had rendered in their respective spheres. Mentioning that the burden of the heavy English income tax had induced the shareholders of the Bombay Electric Supply and Tramways Company to move the direction and management to India, Mr. Garcke stated that Mr. C. Shirreff B. Hilton and himself had had the satisfaction of being associated with Sir Charles Ollivant, the chairman of the Bombay Company, for the past ten years. Sir Charles had consented to join the board of the British Electric Traction Company. In securing him as a director the board had rendered the company an important service. The meeting duly elected Sir Charles, and re-elected Mr. C. E. Tegetmeier and Mr. P. D. Tuckett as directors. The chairman remarked that Mr. Tegetmeier was chairman of the fund contributed by the employees and the company for maintaining the families and dependants of those who had joined the Forces in approximately the same position as before the war.

2nd Lieutenant E. L. F. Beatty, who was killed in action, on June 24, on the Western front, was the eldest son of Mr. A. H. Beatty, of Balfour, Beatty, and Company. He joined the ranks early in the war, and was gazetted in February last year. At the time of his death he was serving in the 73rd Trench Mortar Battery. Writing to Mr. Beatty, the commanding officer said: "He met his death bravely, going up into a heavy bombardment, his detachment being hit by a shell which killed him and four men. He was an exceptionally keen officer, and was liked and respected by all."

The death is announced of Mr. Lorenzo W. Crosta, a notable engineering inventor. Until about a year ago he was managing director of the Railway and General Engineering Company, Ltd., of Nottingham.

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CONTRACTS AND ORDERS.

Hadfields, Ltd., have received a contract for the supply and delivery of steel tires and axles for Salford Tramways Committee.

Rawtenstall Council have placed a contract for a 2,000 kw. turbo-generator with James Howden and Co., Ltd., and for condensing plant with Mirrlees, Watson and Co., Ltd. The generator will be manufactured by the General Electric Co., Ltd.

Messrs. Walton and Clough, who obtained the contract to supply coal conveyors for the Southampton electricity works, have been permitted by the Ministry of Munitions to execute the order.

Salford Council have accepted tenders for the supply of coal for the electricity works at prices ranging from 10*s.* 8*d.* to 18*s.* 4*d.* per ton, and for coal conveyors, bunkers and chutes, by the New Conveyor Company, Ltd., at £1,504.

FINANCIAL REPORTS AND MEETINGS.

Dublin United Tramways Company.—The directors, on July 4, declared interim dividends for the half-year ended June 30, 1916, to the rate of 6 per cent. per annum, less income tax, on the pref. shares, and at the rate of 4 per cent. per annum, less income tax, on the ord. shares. The reduction of 1 per cent. on the ord. shares is due to the loss of over £13,000 in the traffic receipts during the Sinn Fein rebellion.

British Thomson-Houston Company.—The profits for 1915 were £262,361, while £13,797 was brought forward. After providing for interest on debentures, the directors recommend the transfer for reserves and depreciations of £144,878, and to carry forward £73,358, subject to excess-profits tax.

L.C.C. Tramway Receipts.—The traffic receipts for the week ended June 21 were £48,867, an increase of £3,970 as compared with the corresponding week last year. The number of passengers was 11,520,499, an increase of 1,071,495. From April 1 to June 21 (eleven and a half weeks) the total receipts were £558,906, an increase of £86,588 on the corresponding period of 1915. The route mileage was 141.67.

Bombay Electric Supply and Tramways Company.—The total revenue for 1915, including sale of current to the tramways, amounted to £310,770, an increase of 2.71 per cent. The total expenditure amounted to £142,091, a decrease of two per cent. The net profit aggregated £168,679, an increase of £11,006, equivalent to 7.04 per cent. The directors recommend a dividend on the ordinary shares at rate of seven per cent. per annum, free from all income tax, carrying forward £9,603. For the two preceding years the dividend was six per cent.

J. G. White and Company, Ltd.—Mr. Wm. C. Burton, who presided at the annual meeting, stated that engineering constructional work in all parts of the world had been seriously reduced by the war. Their profits for the past year amounted to £17,380, against £19,772 in the previous year, and they were recommending a dividend of six per cent. upon both classes of shares, leaving £34,939 to be carried forward, as against £20,559 in the preceding year. As the directors stated in their report, methods for broadening the scope of the company's work, both at home and abroad, were receiving consideration, and the prospects of satisfactory arrangements being concluded during the current year were encouraging.

Anglo Argentine Tramways. Mr. J. B. Concanon presiding at the annual meeting, said that the board regretted they could not recommend a dividend on the ordinary shares. Although the financial position was sound, enterprise in Buenos Ayres had been almost at a standstill. The high cost of freight and limited tonnage hampered both exports and imports. Up to April 30, although the receipts showed a falling off of only £32 compared with corresponding period in 1915, the expenditure was £33,495 more, entirely attributable to the higher cost of energy; and they would have to face a greater ratio of increase for the remainder of the year. Mr. Pedriali, the general manager, had effected substantial economies. The sinking fund for the redemption of the five per cent. debentures came into operation this year, and would entail a charge on revenue of £8,000. There was no foundation for the rumour that the company was "controlled" by Germans. Mr. G. A. Touche, M.P., in seconding the adoption of the report, said that the gross takings had gone back to about the level of 1912, but they had made strenuous economies. They had provided for all the various charges. The dividends on the first and second preference shares, representing a total of £970,000, had been provided within £2,200.

Swansea Tramways Company.—At the annual meeting the directors reported that the revenue for 1915 amounted to £65,084, a decrease of £1,631. The traffic receipts amounted to £63,088, showing a decrease of £2,047. After setting aside £4,000 for renewals, there remained a surplus of £12,982. The directors proposed to place to reserve £3,000, to pay dividends on 984 preference shares at the rate of six per cent. for the year, on 4,016 preference shares at the rate of five per cent., and on 13,000 ordinary shares at the rate of six per cent. for the year, leaving to be carried forward £2,415. Mr. C. G. Tegetmeier, who presided, referred to the increased charges for materials, and said that the sum of £6,098 spent on repairs and maintenance was considerably less than for some years past. Owing to the high costs and the scarcity of labour, renewals and reconstruction were being deferred. Of late years the allocations to renewals account had been on a liberal scale, and the renewals account would now stand at £19,830. In addition they had their reserve which, with the £3,000 they proposed to allocate to it out of the year's profits, would amount to £42,365. They had repaid the £8,000 which appeared in the previous balance sheet as an indebtedness to the British Electric Traction Co. This was the balance of an advance of £30,000 made many years ago in connection with the electrical reconstruction. He regretted that the working of the Mumbles Railway and Pier again showed a loss, the amount being £2,256, while the rent payable under the lease was £13,900 a year, which was the maximum.

Manchester Corporation Tramways.—In the annual report, which was adopted by the Tramways Committee on June 27, Mr. McElroy, the general manager, states that in the early stages of the war the undertaking was adversely affected, but during the past year a remarkable recovery took place. The ordinary working expenses show a decrease on the figures of previous years, but the total expenditure was increased consequent upon the war service allowances, etc., which amounted to £92,808. Appended is a comparison of the results for the past three years:—

	Year ended March 31.		
	1916	1915	1914
Capital expenditure ..	£2,231,548	£2,216,000	£2,130,904
Amount outstanding ..	£1,626,583	£1,648,183	£1,616,131
Traffic revenue	£925,301	£887,763	£911,223
Total revenue	£939,469	£901,875	£925,310
Working expenses	£654,247	£604,205	£585,224
Gross balance	£285,222	£297,670	£340,086
Net profit	£100,000	£100,000	£103,090
Passengers carried	200,877,667	202,768,420	205,608,741
Fare per passenger	1.06*d.*	1.06*d.*	1.06*d.*
Car mileage	18,486,440	19,155,051	19,463,046
Units per car mile	1.553	1.562	1.543
Power cost per car mile ..	1.687*d.*	1.608*d.*	1.507*d.*
Traffic receipts per track mile	£5,032	£4,835	£5,054
Traffic receipts per car mile	12.013*d.*	11.123*d.*	11.236*d.*
Expenses per car mile ..	8.494*d.*	7.570*d.*	7.216*d.*
Ratio of working expenses ..	50.76%	63.47%	63.25%
Total track mileage ..	203 m. 31 chs.	203 m. 31 chs.	202 m. 48 chs.
Number of cars in stock ..	685	683	662

BUSINESS NOTES.

Tire Depots in the North.—The managers and drivers in transport depots of the tramways and railways in the north-eastern counties, also all other users of solid tires in the same area, will learn with interest that an arrangement has been made whereby Newcastle is a central depot for Spencer Moulton solid tires. The manufacturers' head office have appointed the Forth Engine and Motor Works, Pottery Lane, Newcastle-on-Tyne, as agents in the counties of Northumberland and Durham for these tires, which are known by the title of "Superb Mileage" tires. The Forth Engine and Wheel Works are replete with every convenience for wheel work, general repairs, overhauls, and replacements, and are under the management of Mr. Paynter. In addition to carrying large stocks of all sizes of Spencer Moulton solid tires, he has made adequate arrangement for rapid and efficient handling of wheels and tires by the installation of a hydraulic press.

Spencer Moulton Tire Agency at Bradford.—In the Bradford district Mr. Eric S. Myers has been appointed agent for the Spencer Moulton products. Mr. Myers, who has depots and garages at 50, Manningham Lane, Bradford, and in other parts of the city, has made special preparation for the demands of the motor traction, tramways and railway transporters, by building commercial vehicle works at Bowling. Large stocks of all sizes of Spencer Moulton solid tires are available, so that prompt attention can be given to users' requirements. A special hydraulic press has been installed, in order that wheel work may be tackled quickly and with perfect satisfaction.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of forty-five of the principal tramway undertakings in the United Kingdom for the week ended June 24, give total receipts of £190,772, or £16,361 more than in the corresponding week of last year. The total length of track included in the returns was 2,252 miles, or seventy more than for the corresponding week. The receipts this year were at the rate of £84 14*s.* 3*d.* per mile of single track, and last year at the rate of £79 18*s.* 7*d.*, thus showing an increase for the week of £4 15*s.* 8*d.* per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

DIVIDENDS. PREV.	DIVIDENDS. LAST.	NAME.	PAID.	PRICE, JULY 27th 1914	CASH. July 6.	A WEEK AGO.
5%	5%	Alabama Traction. 5% 1st. Mt.	—	67	68¼	67½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	71/5xd	73/1½xd
4%	4%	Do. 4% Deb. ...	100	91	74¼xd	76¼xd
4½%	4½%	Do. 4½% Deb. ...	100	98½	74xd	76¼xd
5%	5%	Do. 5% Deb. ...	100	96	77	77
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1⅞	18/3	18/3
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	96xd	96xd
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11¼	10⅞	10⅞
4½%	4½%	Do. 4½% Deb....	100	96	85½xd	85½xd
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	92xd	97½
$1	$1	Brazilian Trac. & Power Ord....	$100	66	63¾	61½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	94	94½
4/-	4/-	Brisbane Elec. Trams. Otd. ...	5	7½	6¾	6¾
2/6	2/6	Do. 5% Cum. Pref.	5	5	90/-	90/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92¼xd	92¼xd
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	39½	39½
6%	5%	Do. Pref. Ord....	100	106	40½	40
5%	5%	Do. 5% Cum. Pref.	100	103	62	58½
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	80½	80½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	64½	64¾
—	—	Brit. Elec. Trac. Ord.	100	—	35¼xd	38¼xd
—	— *	Do. 6% Cum. Part Pref. ...	100	—	80¼xd	79¼xd
5%	5%	Do. 5% Deb.	100	92	82	82
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	70½	70½
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	92½	92½
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	6¾	6½
1/3	1/3	City of B.A. Trams.	5	5½	93/9	93/9
5/-	5/-	Dublin United Trys 6% Pref.	10	12	11	10⅞
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	½	2/1½	2/1½
5/6	6/-	Lanarkshire Trys. Co.	10	10½	9¾	9¾
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81xd	81
9d.	9d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1d.	Lond. & Sub. Traction Ord. ...	1	1/2	2/6	2/6
6d.	6d.	Do. 5% Pref.	1	1/2	8/10½	8/10½
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	58xd	58xd
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88½xd	90¼xd
5%	5%	Do. 5% Inc. Deb.	100	88½	81	80½
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	48¼xd	48¼xd
3/-	3/-	Madras Elec. 6% Pref. ...	5	5⅛	96/3	96/3
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67½xd	67½
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	71	72
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	80¼xd	80¼xd
$1½	$1½	Mexico Trams. Common ...	$100	70	27½	27½
5%	5%	Do. 1 Mt. 5% G.B.	—	8¼	40½	40½
6%	6%	Do. 6% Mt. Bds.	100	76	34½	34½
4½%	4½%	Montreal St.4½%Stg.Debs.(1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs.	100	99	92½	92½
1/2*	1/2*	National Steam Car	1	⅛	16/6	16/-
9d.*	9d.*	New General Traction	1	¼	7/9	7/9
6d.	8d.	Northern Gen. Trans. Ord. ...	1	⅜	16/-	16/-
5/-	5/-	Para Elec. Rlys. Ord.	5	⅝	66	61/3
5%	5%	Do. 5% 1st Deb.	100	89½	70½	70½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	83	83½
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	⅛	10/4½	10/4½
8d.	10d.	Provincial Trams. Ord.	1	¼	15/10½xd	15/10½xd
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84	84
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	92xd	93¾
5%	5%	1st. Mt. 5% 50 yr.	100	89½	82½	82½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	90½	90½
5%	5%	Do. 5% Perp. Deb.	100	99½	79½	79½
—	—	Singapore Elec. Trams	5/-	¼	3/7½	2/9
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	94½	94½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	85	85
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	92½	92½
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	78	77
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	9/3	8/6
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	88/9xd	85/-
		Metropolitan Dist. Ord. ...	100	21¼	19½	19⅜
		Undgd. Elec. Rys. of London ...	10	2½	37/6	37/6
		Do. "A"	1/-	⅜	6/6	6/4½
		Do. 4½% Bds of 1933 Rd.	—	99	106xd	106
		Do. 6% 1st Cum. In. Db.	100	114	106½	107
		Do. 6% In. Bonds Rd. ...	—	88	88½	87⅝

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1915	1916	Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	July 1	£48,158	£46,726	27	£1,326,059	— £6,632
Auckland.....(28 days)	June 2	20,511	21,152	48	253,058	+ 4,949
Ballarat and Bendigo ...	Apr. 23	3,920	3,727	4	3,727	— 193
Brazilian Traction Mlrs.	May	6 670 110	7,091,000	22	32,989,000	+1,896,830
Brisbane	Apr.	29,890	32,575	18	129,450	+ 12,610
British Columbia.....$	Apr.	540,861	549,046	43	5,531,103	— 764,709
Buenos Aires Lacroze ...	June 12	40,421	36,213	52	490,818	— 15,324
Burmah Tramway ... Rs.	July 1	4,037	3,605	48	...	+ 5,512
Calcutta.....Rs.	,, 1	65 884	67,162	27	1,741,696	+ 86,246
Cape Town	Mar.	...	14,994	...	...	...
Carthagena & Herrerias..	June	2,059	3,512	26	16,369	+ 5,721
Cordoba	Apr.	13,609	14,053	4	14,053	+ 444
East India	June	2,194	2,283	48	23,150	+ 1,597
Hong Kong .....$	June 3	10,902	12,719	25	297 573	+ 65,459
Kalgoorlie	March	2,638	2,479	13	6,963	— 399
La Plata	June	3,875	3,735	26	25,925	+ 160
Lima	Apr.	31,623	33,556	18	134,629	+ 5,614
Lisbon .....Escu.	Apr.	...	190,051	18	712,651	...
Madras .....(2 weeks)	June 30	29,180	29,250	26	370,342	+ 27,507
Manila .....$	Apr.	117,450	124,350	...	505,381	+ 16,765
Manaos .....Rs.	March	...	157,156	...	...	...
Melbourne	Apr.	...	69,542	...	...	...
Montevideo	June	24,266	25,300	34	241,068	+ 14,376
Peruvian .....$	June	759,374	929,500	52	9,763,497	+1,403,792
Port Elizabeth	Mar.	...	3,857	...	...	...
Rangoon	June	4,997	4,205	26	28,581	— 1,164
Shanghai .....$	May 31	25 920	29,206	...	...	...
Singapore .....$	May 27	11,675	11,992	21	259,251	+ 30,633
Toronto.....$	Apr.	795,816	883,209	18	3,546,784	+ 319,541
Winnipeg	Apr.	264,856	282,498	18	1,169,808	— 63,597

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	1916	Incr. or Dec.	Wks.	Aggregate. 1916	Incr. or Dec.
Aberdare	June 27	£321	£354	+ 33	13	£4,782	+ £279
Aberdeen Corporation...	,, 28	1,753	1,834	+ 81	4	7,514	— 194
Accrington Corp.....	,, 21	559	639	+ 80	12	7,001	+ 242
Ayr Corporation	July 1	414	385	— 29	7	2,636	+ 16
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.....	,, 2	1,452	1,556	+ 104	13½	19,883	+ 1,440
Birmingham Corp.	,, 1	13,365	16,322	+ 2 957	13	214,943	+ 38,209
Do. Motor Omnibuses	,, 1	892	970	+ 78	13	12,301	+ 1,166
Blackburn Corp.	June 28	1,319	1,263	— 56	13⅓	17,520	— 512
Blackpool & Fleetwood.	July 1	1,237	893	— 344	26	13,422	+ 581
Blackpool Corp.	June 29	2,190	1,630	— 560	13	19,089	+ 2,380
Bolton Corporation.....	July 2	2,955	2,826	— 129	14	38,642	+ 2,304
Bournemouth Corp.....	,, 5	2,122	2,304	+ 182	14	30,584	+ 879
Bradford Corporation ...	,, 1	6,596	6,551	— 45	13	89,401	— 385
Brighton Corporation ...	,, 2	1,201	1,236	+ 35	13⅔	15,290	+ 823
Bristol	June 30	10,371	10,508	+ 137	26	240 441	+ 8,992
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	July 1	1,758	1,601	+ 158	14	24,025	+ 948
Burton-on-Trent Corp...	,, 2	292	270	— 22	13	3,449	— 425
Bury Corporation.....	,, 2	1,405	1,344	— 61	14⅔	19,503	+ 495
Cardiff Corporation.....	June 24	2,701	2,931	+ 230	12	35,162	+ 1,590
Chatham & District.....	,, 29	1,295	1,317	+ 22	26	29,530	+ 1,185
Chesterfield Corp.	,, 22	264	271	+ 7	12	3,323	+ 119
Colne Corporation	,, 24	234	264	+ 30	...	...	...
Cork Electric	,, 29	560	567	+ 7	26	12,416	— 217
Croydon Corporation ...	Apr. 28	1,726	1,403	— 323	4	5,417	— 666
Derby Corporation	July 1	1,107	1,114	+ 7	13½	14,813	+ 573
Dover Corporation	,, 1	332	321	— 11	13	4,061	— 13
Dublin & Lucan	June 30	134	199	+ 65	26	3,407	— 311
Dublin United	,, 30	6,824	7,274	+ 440	26	145,671	— 9,203
Dundee City	,, 28	1,379	1,377	— 2	6⅔	8,738	+ 199
East Ham Corporation	July 1	1,304	1,390	+ 86	13½	17,357	— 108
Exeter Corporation.....	June 30	389	nil		13	4,923	— 144
Glasgow Corporation	July 1	22,565	23,065	+ 500	4⅔	107,194	+ 7,374
Glasgow Subway.....	,, 1	1,009	1,067	+ 58	26	31,110	+ 3,142
Glossop (U. Elec. Supp.)	,, 1	134	133	— 1	27	3,608	+ 409
Halifax Corporation.....	June 27	2,202	2,234	+ 32	12⅔	28,612	— 467
Do. Motor Omnibuses	,, 27	53	50	— 3	12⅔	591	— 68
Hastings & District.....	,, 30	1,024	1,042	+ 18	26	22,357	+ 319
Huddersfield Corp.	July 1	2,753	2,832	+ 79	13	38,559	+ 3,019
Hull Corporation	,, 1	3,048	3,184	+ 136	13	40,727	— 636
Ilford U.D.C.	,, 1	702	745	+ 43	13	9,139	+ 514
Ilkeston Corporation ...	,, 5	132	133	+ 1	14	1,877	+ 68
Ipswich Corporation	,, 1	640	619	— 21	13	6,986	+ 226
Isle of Thanet	,, 1	474	384	— 90	39	10,855	— 2,045
Kilmarnock Corp.	June 24	176	188	+ 12	5⅔	964	— 50
Lanarkshire	,, 29	2,009	2,372	+ 363	26	57,341	+ 9,170
Lancashire United	,, 28	2,041	1,851	— 190	26	44,355	+ 1,468
Leeds City.....	July 1	9,253	9,764	+ 511	14	128,180	+ 9,746
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	,, 1	805	850	+ 45	6⅔	5,784	+ 414
Leyton U.D.C.....	June 29	1,600	1,753	+ 153	13	21,343	+ 120
Liverpool Corporation...	July 1	14,392	14,477	+ 85	26½	356,265	+ 15,009
Llandudno & Colwyn B.	June 30	415	426	+ 11	30½	7,864	— 293
London County Council	,, 21	44,897	48,867	+ 3,970	11⅔	558,906	+ 86,588
London Genl. Omnibus	*	...	...	...	...	...	...
London United.....	*	...	...	...	...	...	...
Lowestoft Corporation...	,, 10	188	132	— 56	35½	4,642	— 1,379
Maidstone Corporation..	,, 29	234	210	— 24	13	2,778	— 100
Manchester Corp.....	July 1	18,798	20,674	+ 1,876	13	249,375	+ 10,898
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	June 24	177	203	+ 26	12½	2,665	+ 257
N'castle-on-Tyne Corp.	,, 24	6,564	6,824	+ 260	12	77,346	+ 1,856
Newport (Mon.) Corp....	July 1	875	904	+ 29	13	12,008	+ 701
New St. Helens & Dist.	June 28	1,096	1,039	— 57	52	51,935	+ 2,754
Northampton Corp.....	,, 23	779	665	— 114	12	8,332	— 1,007
Nottingham Corp.....	,, 29	4,581	3,907	— 674	13	49,377	+ 442
Oldham Corporation ...	July 2	2,236	2,400	+ 164	14	35,680	+ 1,957
Portsmouth Corp.....	,, 1	2,605	2,754	+ 149	14	35,386	...
Preston Corporation.....	June 28	977	1,042	+ 65	12⅔	13,813	+ 1,418
Provincial	July 1	2,447	2,464	+ 17	39	84,276	+ 4,144
Reading Corporation.....	June 29	814	836	+ 22	12⅔	10,460	+ 381
Rhondda Tramways.....	,, 15	1,218	1,557	+ 344	24	29,033	+ 1,476
Rochdale Corporation...	July 1	1,772	1,647	— 125	13½	24,103	+ 435
Rotherham Corp.....	,, 5	1,158	1,571	+ 413	13⅔	19,847	+ 4,426
Salford Corporation.....	,, 3	5,332	5,654	+ 322	13⅔	74,158	+ 2,938
Sheffield Corporation....	,, 2	8.654	10,741	+ 2,087	14½	145,548	+ 23,987
Southampton Corp.....	June 28	1,474	1,679	+ 205	12⅔	20,125	+ 1,254
Southend-on-Sea Corp...	,, 28	737	895	+ 158	13	10,217	— 310
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.....	July 1	834	809	— 25	13½	10,472	+ 76
Sunderland Corp.....	,, 2	1,559	1,613	+ 54	13	20,744	+ 751
Sunderland District...	June 28	605	630	+ 25	35	20,286	+ 1,050
Swindon Corporation ...	,, 28	196	198	+ 2	12⅔	2,533	+ 10
Torquay Tramways.....	,, 22	557	597	+ 40	25	12,236	+ 23
Tyneside Trys. & Tmrds.	,, 21	828	667	— 161	25	13,342	— 1,000
Wallasey Corporation ...	July 1	1,392	1,388	— 4	13½	17,519	+ 320
Walsall Corporation.....	,, 1	781	826	+ 45	27	20,946	+ 2,426
Walthamstow U.D.C....	,, 1	957	1,133	+ 176	13	14,161	+ 1,921
Warrington Corp.....	June 29	469	491	+ 22	13	6,216	+ 455
West Ham Corporation	,, 29	3,081	3,304	+ 223	12⅔	41,968	+ 1,786
Wigan Corporation	,, 29	1,546	1,628	+ 82	13	21,464	+ 1,284
Wolverhampton Corp....	July 5	1,119	1,197	+ 78	14	16,675	+ 1,466
Yorkshire (W. Riding)...	,, 2	1,542	1,870	+ 328	27	45,618	+ 4,075

* Issue of Traffic Returns suspended during the War.

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AND
MAINTENANCE
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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

Founded 1892. LONDON, JULY 13, 1916. VOL. XL.

TRACK FOUNDATION IN AUCKLAND, NEW ZEALAND.

By HAROLD BOND.

Track foundation has been throughout the history of electric traction one of the most difficult problems which tramway engineers and tramway financiers have had to deal with, and probably few have met with greater difficulties than those which have been experienced on the system of the Auckland Electric Tramways Company. The city of Auckland lies on the shores of the Waitemata Harbour, the central part of the city being located on the comparatively flat land fringing the water front, and from here the ground rises rapidly to the undulating country where the remainder of the city and the suburbs are situated. Moreover, this undulating country is broken by a number of extinct volcanic cones, and it will thus be seen that the main physical features of the tramway system are a large number of more or less excessive grades, and, for the most part, somewhat tortuous routes. Further, the large and heavy cars, together with the high speeds at which they run, tend towards an abnormal wear and tear on the permanent way.

General View of the City of Auckland from North Shore of Waitemata Harbour.

It should be mentioned that in Auckland the system of paving the tramway area across its full width with granite setts is not employed, and therefore, except in certain main streets in the city where Neuchalet asphalte, wooden blocks, or some other form of paving has been adopted, a concrete base to the road surface between the rails is not necessary. Ordinary water-bound macadam with a single row of setts, laid serrated on each side of the rails, is the type of road surface adopted on by far the larger portion of the system. This water-bound macadam is gradually being replaced by some form of tar or bituminous macadam, and on these portions the stone setts along the edges of the rails are dispensed with. This tar and bituminous macadam not only serves the purpose of forming a more lasting road surface, but has a considerable influence on the life of the track foundation, as it will be shown later that the chief object that has to be attained on the clay areas is the prevention of the track foundation becoming water-logged during the winter months, when the rainfall in Auckland is fairly heavy.

The standard foundation adopted when the tracks were first laid down, some fourteen years ago, was that generally known as the longitudinal concrete stringer construction, a concrete stringer 1 ft. 6 in. wide and 9 in. deep being laid directly in the ground and under the centre of each rail. The rails, which were of 92 lb. girder section, were embedded slightly in the concrete. This form of foundation has proved fairly durable on the small portion of the system which is on the rock area, but on the clay area it has proved difficult and expensive to maintain. The trenches in which the concrete stringers are laid form a natural drainage for the surrounding soil, the water collects in these trenches, and, having no further means of escape, puddling commences, and in time the concrete is left

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without support, the tendency then being for it to break up into short lengths and sink down more or less irregularly, allowing the track to become wavy, the rails crippled, and the block edging to sink below or fall away from the rails. Resort to packing metal chips between the rail and concrete only met with

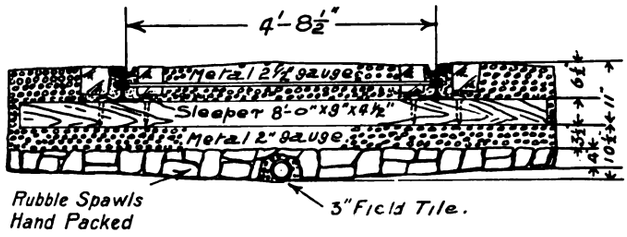

Fig. 1.

temporary success, as the same puddling action continued, and the concrete sank still further.

It became apparent to the general manager, Mr. J. J. Walklate, that remedies would have to be sought in two directions; firstly, in a larger bearing area for the foundation, and secondly in the proper drainage of the foundation, but at the same time a construction which was not prohibitive in cost would have to be discovered. To this end the wooden cross-sleeper construction with a foundation of rubble-spawls, drained with field-tiles, was adopted,

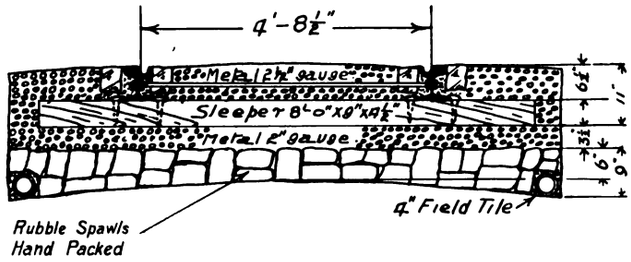

Fig. 2.

and with certain improvements, which have from time to time been found advisable, these form the main features of the present day track foundation in Auckland. The earliest standard type of wooden cross-sleeper construction, and one which was employed for some years, is shown in Fig. 1. From this it will be seen that a trench about 8 ft. 6 in. wide was excavated, having a depth at the sides of 1 ft. 9½ in., with a fall of 3 in. to the centre, a row of 3 in. field-tiles being laid down the centre at this lowest point. On the bottom of this trench large rubble-spawls were hand packed to a depth varying from 4 in. at the outside to 7 in.

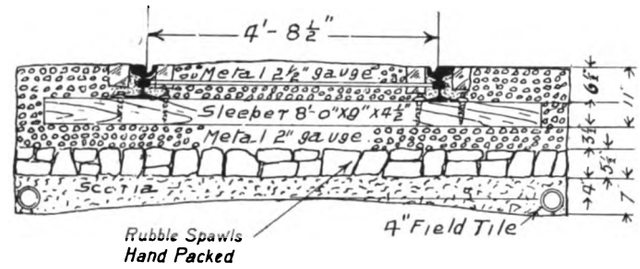

Fig. 3.

near the centre of the trench, small bluestone metal being placed round the field-tiles to prevent breakage. Above this rubble-spawl foundation a depth of 3½ in. of bluestone metal, broken to 2 in. gauge, was employed for packing up the sleepers. The rails were spiked down to the sleepers, these being of Australian hard-

The Business District of Auckland.

wood, 8 ft. by 9 in. by 4½ in., and being placed at about 2 ft. 3 in. centres. Outlets were obtained for the field-tiles into cess-pits, &c., wherever possible.

This construction, although superior to the concrete stringer type, was found to be defective in so much that in time the field-tiles were liable to silt up and allow water to lie in the trench, thus leading to puddling of the clay, and resulting in a gradual sinking of the track. This led to the adoption of an improved type of wooden cross-sleeper construction, shown in Fig. 2. Here it will be seen that the depth of rubble-spawls was increased from an average of 5½ in. to an average of 7½ in., while the bottom of the trench was given a fall from the centre to the outside, a double row of 4 in. field-tiles, one on each side of the trench, replacing the single row of 3 in. field-tiles in the centre. Apart from the greater depth of spawls and the extra row of field-tiles, this construction had the advantage over the earlier one in so much that, should the field-tiles become silted up, they could be taken out and cleaned without disturbing the foundation to any extent.

This Fig. 2 construction has been used on nearly all extensions and reconstructions during the past three or four years, but recently a further improvement has

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been made on areas where the clay is of an excessively puddling nature by the use of a volcanic ash, known as scoria, which is readily obtainable from the extinct volcanoes round about the city. Where this scoria is used the depth of the trench is increased to about 27 in. on the outside with a fall of 3 in. from the centre as before. A layer of scoria is placed on the bottom of the trench to a depth of 4 in. and 7 in. at the centre and sides respectively, the double row of field-tiles being placed on the outsides of the trench as in the Fig. 2 construction, but, being embedded in the scoria, it is not necessary to place bluestone metal round them. On top of this layer of scoria the rubble-spawls are then laid to a depth of from 5 in. to 6 in. This construction is shown in Fig. 3.

Although scoria has not yet been in use sufficiently long for any decisive conclusions to be come to as to its value, it is believed that it is of such a nature that it will prevent the silting up of the field-tiles and the working up of the clay into the foundations of the track. Moreover, scoria being of a fine nature, should distribute evenly over the whole of the bottom of the trench the weights transmitted to it from the spawls above, and further, being of a porous nature, it should form a natural drain in the bottom of the trench apart from the field-tiles. There would seem to be a certain tendency in the constructions shown in Figs. 1 and 2 for the spawls to be driven into the bottom of the trench, and thus for the even distribution of weight to be lost. It is believed that the layer of scoria below the spawls will obviate this defect.

On routes where the tramway traffic is particularly heavy the 92 lb. rail is being replaced by a stronger and deeper rail, weighing 110 lbs. per yard, and coach screws are being used in place of spikes for holding the rails down to the sleepers. In recent years the distance between centres of sleepers has been reduced to 2 ft. 2 in., and in some cases less.

On existing track laid on the original longitudinal concrete stringers, when replacing the foundation by any of the above-mentioned types of wooden cross-sleeper construction the work is carried out without any cessation of traffic. The trench is excavated on either side of the concrete stringers which, if they have not already been broken sufficiently while in use, are broken into short lengths with gads and removed into the trench, where they are spawled and used in the new foundation, the rails being meanwhile supported on wooden blocks.

No new tracks are now being constructed with the longitudinal concrete stringer, even where rock is met with, as it is found that the concrete is liable to disintegrate immediately underneath the rails, and because this rigid form of construction tends to encourage the development of corrugation. In such cases wooden cross-sleepers are employed, a few inches of metal being used for packing between the sleepers and solid rock.

A few experimental lengths have recently been laid, both on clay and rock areas, with the sleepers packed up directly on scoria, no rubble-spawl or bluestone being used in the foundation.

From the foregoing remarks it will be seen that the severe local conditions of traffic, together with a very unsuitable sub-soil, have necessitated a very large amount of thought being given to the problem of reducing the cost of maintenance of the tracks, while at the same time keeping the original and reconstruction costs within bounds.

View showing Centre Pole Construction in Queen Street and Type of Car Used in Auckland.

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PARIS TRAMWAYS ELECTRIFICATION.

(*Concluded**).

Type of Conduit Adopted—Comparison with London Designs.

The type of central conduit adopted by the General Omnibus Company for use in Paris closely resembled that chosen by the London County Council. Some improvements were made, however, one of which lies in the fact that whereas the London conduit yokes are only alternately provided with two arms, in the Paris design

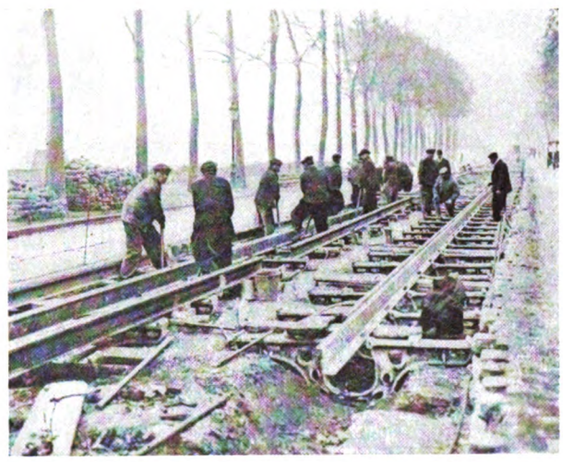

Fig. 1.—Sectional and Plan View of Yokes, Slot and Track Rails.

every yoke stretches right across the track, and hence serves to carry the weight of rolling stock on the running rails, which rest on their arms. The yokes, which, as stated in the table, given on page 346 of the issue of May 11, are set at intervals of 4 ft. 3 in., are of cast metal, and weigh about 360 lbs. each. Every effort has been made to reduce their weight while maintaining their strength and solidity. Cast-iron was thought preferable to steel, as giving greater rigidity and avoiding differences in slot width due to the ductility of steel. To have used cast steel would have involved an impossibly heavy outlay.

Weight reducing holes are cast in the chairs, to the number of twelve in each, with stiffening ribs round them. These also serve to bind the yokes firmly into the concrete. The total depth of the chair below the slot rail is 24 inches. Very severe tests under hydraulic pressure were made on chairs picked out at random, the material standing a compression test of from 7 to 16 tons before fracture at the particular part of the yoke under test.

The slot rails are, of course, fixed to the yoke centres, special $\frac{7}{8}$ inch bolts being used for the purpose. The bolt heads are underneath, and are shaped so that no rough edges shall project from the contour of the conduit itself. The bolt holes are made oval to allow of varying the width of slot. In Fig. 1 are shown sectional and plan views of conduit and yoke, from which may be seen the double T section of the yoke arms†. These arms are 6 in. high and $7\frac{1}{4}$ in. broad, thus presenting a good wide surface as rail chairs for carrying the running rails. The latter rest on flat pieces of teak laid on the yoke arms; these wooden plates measure $7\frac{1}{4}$ in. by $6\frac{1}{2}$ in. by $\frac{3}{8}$ in. thick. Stamped steel plates shaped to fit the slopes of rail base are used one on each side of the running rail, with four bolts passing through the steel plates and flat top of yoke arm. The heads of these bolts are set underneath the top plate of yoke arm, and are protected from the concrete bed of conduit by a tin plate hood, which leaves enough space to allow of the bolts being easily extracted and replaced without breaking or disturbing the concrete.

As the steel tie plates have rectangular bolt holes cast in them to permit of horizontal adjustment, when once the line is gauged up they are kept in place by means of soft steel keys of wedge shape, driven firmly home. Further, in order to give additional elasticity to the rail foundations, bedded on to the yoke arms, and to prevent the bolts from shaking loose to the eventual destruction of the road bed from "pumping" rails, plates of paraffined teakwood, $\frac{5}{8}$ in. thick, are inserted under the rail base at the yoke arms. These plates will bear a crushing stress of at least $5\frac{1}{4}$ tons per square inch when the wood is dry, and they are paraffined to prevent them from absorbing moisture, which would greatly reduce their resistance. Whilst sufficiently thick to stand hard work, they are thin enough not to interfere unduly with tightening up the holding-down bolts. Special projections are cast on the upper surface of the yoke arms, which serve for anchoring short, flat steel tie rods to the slot rails, thus greatly stiffening the structure at the yoke arms, the tie rods being attached to the slot rail webs close under the treads (Fig. 2). They measure approximately 2 ft. in length by 4 in. in width, and prove sufficient to maintain a permanent slot width where the street paving is of stone, but in the case of wood paving other and longer tie rods of similar section are put in at the middle of each interval between the yoke tie rods. These are anchored at the outer ends to the line rails.

The running rails themselves are as usual of the grooved type, weighing about 102 lbs. to the yard; they are $7\frac{1}{4}$ in. deep, with a base $6\frac{1}{4}$ in. wide; the normal length is 59-60 ft., but shorter ones are also employed down to 32 ft.

The slot rails of Z section (Fig. 1) weigh 63 lbs. per yard; they are $7\frac{1}{4}$ in. deep, with a base $3\frac{3}{4}$ in. wide. The

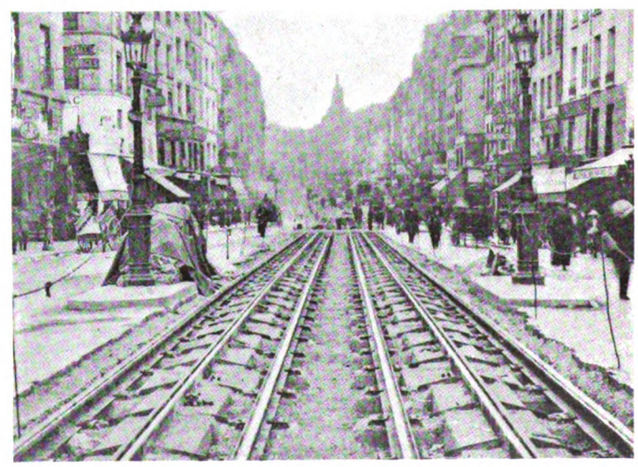

Fig. 2.—Conduit Track Ready for Paving, showing Roof of Conduit and Slot Rails Tied to Yokes.

slot width, which in the case of some conduits runs about $1\frac{3}{4}$ in., and even $2\frac{3}{8}$ in. on several of the side conduit systems, has been reduced to $1\frac{7}{16}$ in. The total opening therefore, including the slot, is not more than 4 in., or about the same as that of an ordinary grooved running rail, including the groove.

The steel contact rails in the conduit average 25 ft. 7 in. in length; they are of T section set sideways, the crosspiece being much longer than the stem, having a width of $4\frac{3}{4}$ in. on the contact face. They weigh

* Continuation of an article begun in The Tramway and Railway World of May 11 and continued in the issue of June 8.

† Vide also cross section and plan, p. 346, May 11, 1916.

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about 25¼ lb. per yard. The resistance is approximately 13 microhms per centimetre, and the kilometric resistance ·08 watt at 0° Centigrade. The cross section is considered ample for limiting the fall of pressure within reasonable limits, and thus avoids the need of numerous feeders. To prevent jarring on the passage of the contact ploughs, the ends of the rails are machined off.

The rails are supported on insulators fixed at distances apart of 12 ft. 0 in. on straight lengths of line. Elsewhere, on curves of short radius, at crossings and points, they are naturally spaced at much shorter intervals. A means of horizontal adjustment in fixing the rails to the insulators is provided by the use in the shank of the fork plate carrying the stem of T rail of an oval hole through which passes a square-headed stud screwing up into the insulator. Lock nuts above and below the fork plate keep the rail and fork plate in the proper vertical position. Two copper cable bonds of ample section serve to ensure electric continuity at each rail joint. These are soldered into copper sleeves pressed beforehand into holes at the rail ends, the soldering being done after the rails are fixed in position.

The insulators are of the single bell type with corrugated surfaces, and are sufficient for the working pressure of 600 volts. Each is cemented into a corresponding cast-iron bell, which serves to keep off mud from the insulator and forms part of the insulator supporting bracket, bolted on to the base of the adjacent slot rail above. To make sure that the insulator supports had the same levels throughout, the bolts and covering bells were set on separate continuous supports—a hundred at a time—the cement being then run in and left to dry.

The Choice of Rolling Stock.

The question of rolling stock to be employed on the newly-transformed system was one calling for long and anxious consideration. The importance of choosing the most suitable and convenient type of vehicle from the passengers' point of view, and one that would prove the safest and most economical to operate, could not be overrated. The "imperiale" or open upper deck, with roof, to which Parisians have long become accustomed, has many inconveniences. It is difficult of access, comfortless in winter, allows little head room on the lower deck, and makes it no easy matter to collect the fares.

Probably every electric tramway manager operating both double deck and single deck cars has found from experience that the running time of the latter is much less than that of the former over the same routes. The delay in going up and down a narrow and awkward staircase adds greatly to the length of stops, but this delay cannot well be avoided, as there must be allowed a minimum time to mount or descend, especially for women and children. As for the second objection, since the upper deck has a roof, it might be said that by glazing the sides and ends the top seats could be made perfectly comfortable in winter. Unfortunately the prescribed maximum width of 6 ft. 6 in. makes an "imperiale" closed in at the sides still more difficult for the conductors to collect fares properly.

The upper deck, roofed but left open at the sides, is therefore deserted in winter owing to the want of comfort; consequently the carrying capacity of the line is very much reduced, and also (since the "imperiale" is always second-class) only first-class places and too small a number of second-class seats on the lower deck are available for would-be passengers, who thereupon take to other and competing means of transport where they can find more second-class room. The third difficulty of the "imperiale," that of low head room, cannot well be avoided, as on many lines the overall height of car is limited by the vertical space available under certain bridges. This leads to cramped accommodation, bad ventilation, and great inconvenience to passengers in moving in and out. Lastly, the collection of fares on a car with "imperiale" is certainly difficult to carry out under good conditions, especially with sectional tariffs.

On the other hand, a car with "impériale" has the great advantage of large seating capacity without excessive car length, and consequently allows the use of two axles only. Nevertheless this advantage is not enough in itself, and long experience has by now shown that the difficulties already specified must lead to preference being given to vehicles without the "imperiale."

The need for great capacity of passenger accommodation implies an increase in the length of cars, and thereby raises a number of points requiring attention—easy running round curves, absence of rocking and side motion, strength and yet lightness of trucks and body, and there is sometimes being involved a difficult lowering of the framework in the centre of the body to allow of a platform for passengers to ascend to or alight from the car.

Experiments carried on by the company before 1910 in electric traction, having in view the present general transformation, had led to the use of bogie cars, that is, the adoption of four axles per car.

The technical problem to be solved in the first place was that of the arrangement and use of these four axles, bearing in mind the conditions that call for sufficient adhesion when towing trail cars. The following solutions call for consideration:—

1. *Cars with Two Bogies and Four Motors.*—This method, of course, gives every satisfaction so far as adhesion is concerned with four axles and a motor mounted on each, but the heavy expense both of first cost and of operation preclude its use on city lines where the amount of energy used must be reduced to a minimum, whatever attraction might be found in railway work or tramways on the outskirts and in the country.

2. *Cars with Two Equal Wheeled Bogies: Two Axles Motor Driven, Two Trailing.*—In view of the working conditions with motors in series or parallel, if four are not used then we must assume two, one motor axle being arranged on each bogie. This arrangement is in use by the General Paris Tramways Company, but it has the defect of insufficient adhesion, and could not be employed on the General Omnibus Company's lines for this reason, as the grades are heavy and trail cars are customary.

3. *Cars with Two Bogies, as in No. 2, but with Bogie Wheels Coupled.*—It has been proposed, in order to gain adhesion, to couple the bogie wheels either by side rods or endless chains. The former suggestion is hardly possible on an overall width of only 6 ft. 6 in.; the cost of installing and working a chain coupling, although tested carefully, proved excessive and out of the question in practice.

4. *Cars with Two Bogies: "Maximum Traction" Trucks.*—This well-known type of truck, each consisting of one motor-driven rear axle and a pony wheel front axle, offers very general advantages that fully justifies its use on most of the Paris lines, both the General Paris Tramways Company as well as the Eastern Paris Tramways Company employing the system, so that the General Omnibus Company followed good precedent in deciding on its adoption. A strong point in its favour is the possibility of setting the points

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of support of the car body very close to the motor-driven axle, thereby increasing the adhesion. The trucks give a very easy motion, especially round sharp curves, but they cost more to maintain in comparison with parallel axle trucks, and the whole of the weight not being on the driven wheels, they have hardly

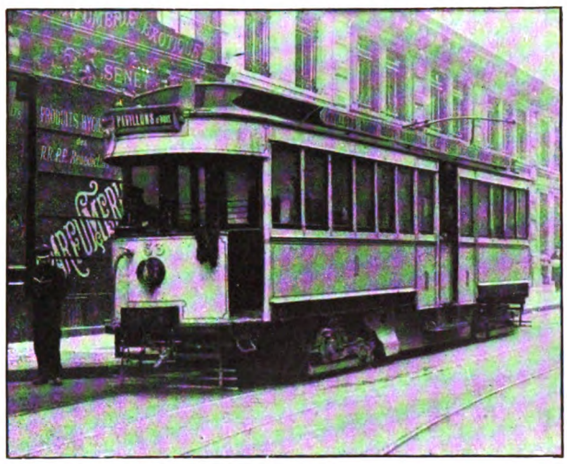

Fig. 3.—Car with Maximum Traction Trucks—East Paris Tramway Company.

enough adhesion for working with trailers on lines having grades steeper than 1 in 33. However, they give excellent service on many of the General Omnibus Company's lines where conditions are favourable.

5. *Cars with Long Wheelbase and Two Motor-driven Axles.*—For some of the steeper grade lines it was found necessary to arrange for a type of car the entire weight of which would be available for adhesion, and also for a car of large seating capacity. These conditions have been satisfied by the use of a long wheel-base car with two parallel axles, each motor-driven. Experiments showed that with a wheel base of 13 ft. 4 in., and a suitable wheel flange, a car could easily pass round a curve of only 60 ft. radius. The type of car actually decided upon, and introduced into the service, has a wheel base of 12 ft. only, the total length

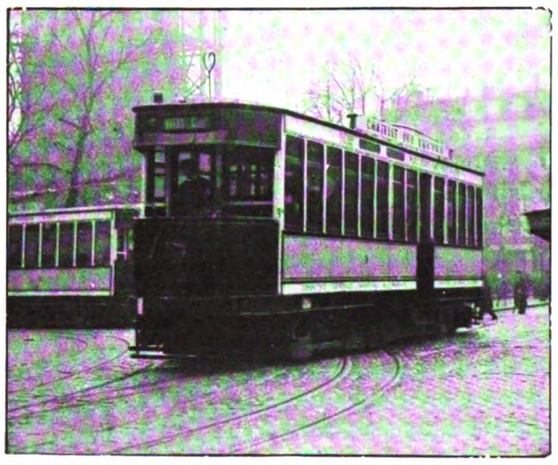

Fig. 4.—Car with Equal Wheeled Bogies—Paris General Tramways Company.

over all being 40 ft. 8 in., yet it has practically no pitching or side motion whatever. A slightly smaller car of this type has also been designed for lines where the traffic is less dense; this has a wheel base of 10 ft. 9½ in., with a total length of 34 ft. and seating capacity for 45 passengers.

Description of Cars in Use.—Three-car Trains.

The types of cars in use by the General Omnibus Company are therefore four in number:—

(*a*) Double bogie truck (maximum traction), carrying 54 passengers.
(*b*) Long wheel base, single truck, double motor cars, carrying 49.
(*c*) Long platform, single truck, double motor cars, carrying 45.
(*d*) Trail cars carrying 57.

Some illustrations of the types of car in use by other Parisian companies at the time of converting to electric traction the General Omnibus Company's network are shown in the annexed figures. Fig. 3 represents a maximum traction car on the Eastern Paris Tramway Company's system, having a weight of 14½ tons and carrying 59 passengers (25 standing, 34 seated). Fig. 4 shows one of the General Paris Tramway Company's cars with equal-wheeled bogies; one bogie has two motors. These cars weigh 18½ tons each, and carry 57 passengers—30 seated and 27 on the platforms.

The General Omnibus Company's cars are shown in Figs. 4 to 13, the following being a brief description of the vehicles represented:—Figs. 5 and 6 are the maximum traction truck cars of Class A, weighing empty 14·8 tons each. The height of the intermediate

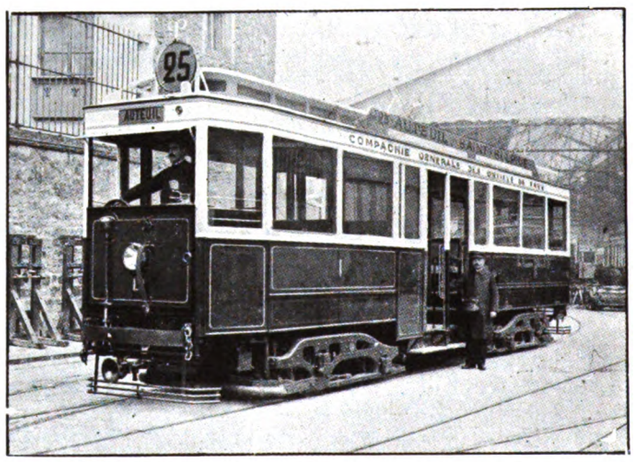

Fig. 5.—Car with Maximum Traction Trucks—Paris General Omnibus Company.

step from ground level is 12¼ inches, and the height from that to the central platform 9¾ inches. Sliding doors give access to the car interiors. Details and a general view of truck are given in Figs. 7 and 8.

Class B—the long wheel base car—is shown in Figs. 9 and 10, and a perspective view of the truck itself in Fig. 11. The weight empty is 13½ tons.

Cars of Classes C and D are represented in Figs. 12 and 13. The first-named weigh 12½ tons each; the latter 7·9 tons. The weights of the motor-equipped cars thus range from 5 to 5½ cwt. per passenger, inclusive of the most complete electric equipment, air brakes with automatic air compressor, and double spring suspension, so that the dead weight cannot be called excessive, taking these features into account.

Amongst the special characteristics of the new rolling stock should be mentioned the following that are regarded as embodying valuable improvements in practice.

First, the car body longitudinal sills are all formed of steel plate in order to obtain strength and lightness, having in mind their great length and the need for dropping them in the centre to allow of centre platforms. They are, in addition, bent round at the ends

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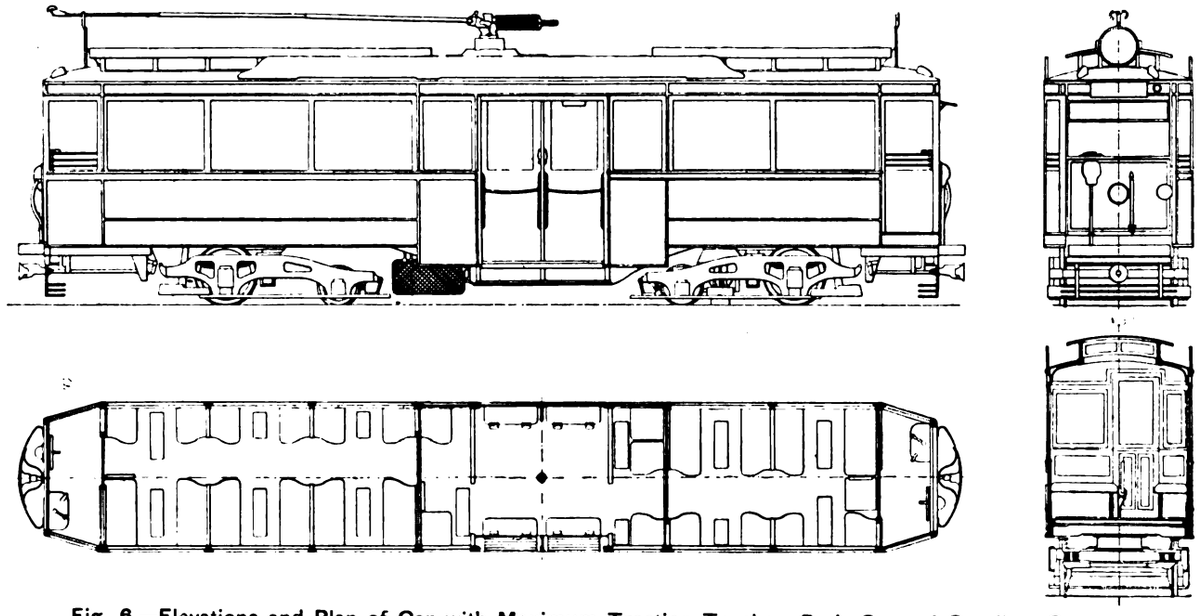

Fig. 6.—Elevations and Plan of Car with Maximum Traction Trucks.—Paris General Omnibus Company.

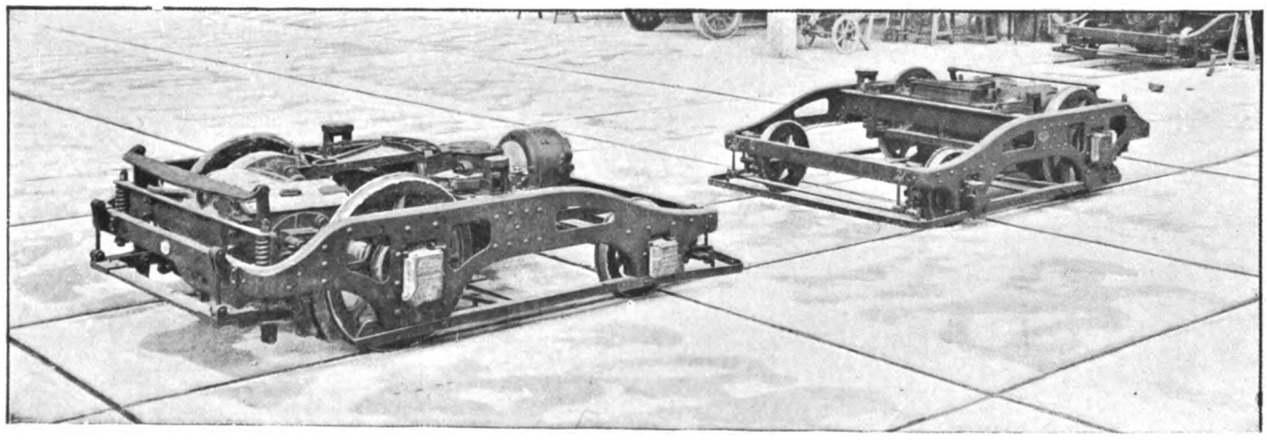

Fig. 7. Maximum Traction Bogies—Paris General Omnibus Company.

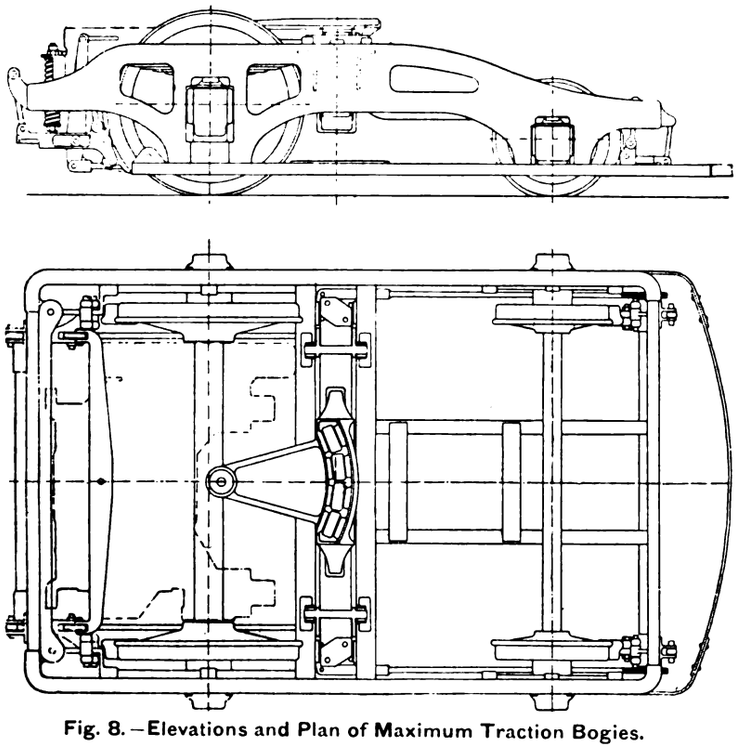

Fig. 8.—Elevations and Plan of Maximum Traction Bogies.

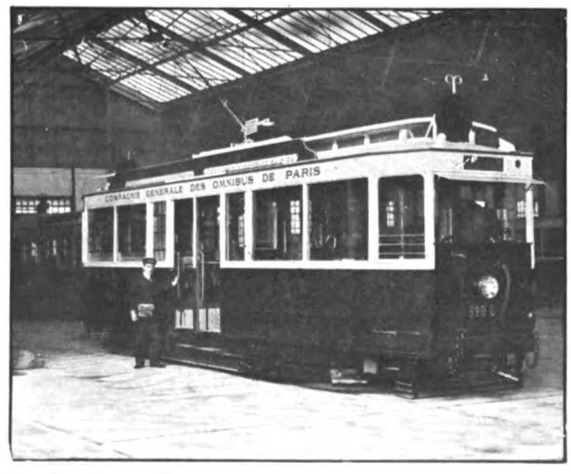

Fig. 9. Single Truck Car with Extra Long Wheel Base.

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to stiffen the platforms, and being entirely covered by the body, allow of some effort being made to preserve a pleasing external appearance to the car. An additional advantage lies in the facility thus offered for letting down to their full depth the car side windows, a matter of some importance in the summer.

Next, all motor trucks are provided with double spring suspensions, one being formed of leaf springs between axle-boxes and truck sills, the other of coiled springs mounted on a crossbeam at each end of truck. These will be noticed in the line drawings that illustrate the trucks.

The electric equipment throughout is by the French Thomson-Houston Company; motors are of two types, G.E. 216 for the long wheel base cars, and T.H. 523 for the maximum traction trucks. The respective weights are 22 cwts. and 25 cwts., not including gear-wheel or gear box. The controller has nine contacts, of which three are for shunting the motor fields coils, two in series and one in parallel. Taking into account the running notches in series and in parallel, without resistances being inserted, the motorman has five economical running notches out of the nine. Each car is provided with a main circuit breaker, two automatic switches, and two fuses.

The trolley pole arrangements are of the usual type, except that in case the trolley wheel runs off the overhead wire a catch at the base of the pole at once releases the tension and the trolley head descends to a level below that of the trolley wire, thus avoiding any danger to the latter. A slight pull on the trolley pole rope re-engages the pole base tension, and as soon as this takes place the full tension is re-established by releasing the pole rope. The wheel is then replaced against the wire.

To cope with heavy traffic on Sundays on the line running from the Louvre to Versailles, three-car trains are run. These comprise each two motor cars with a trail car in between. The motor cars in this case are furnished with multiple unit equipments, so that all four motors may be operated. Westinghouse air brakes and hand brakes also are provided on all cars.

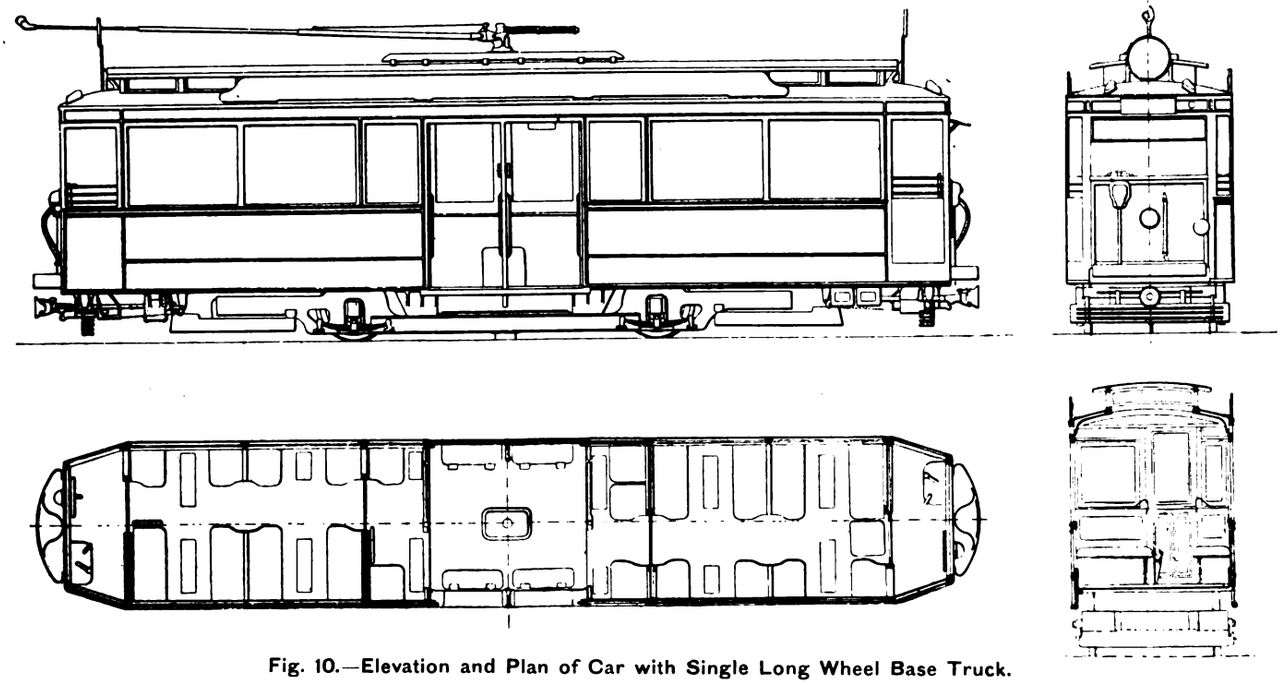

Fig. 10.—Elevation and Plan of Car with Single Long Wheel Base Truck.

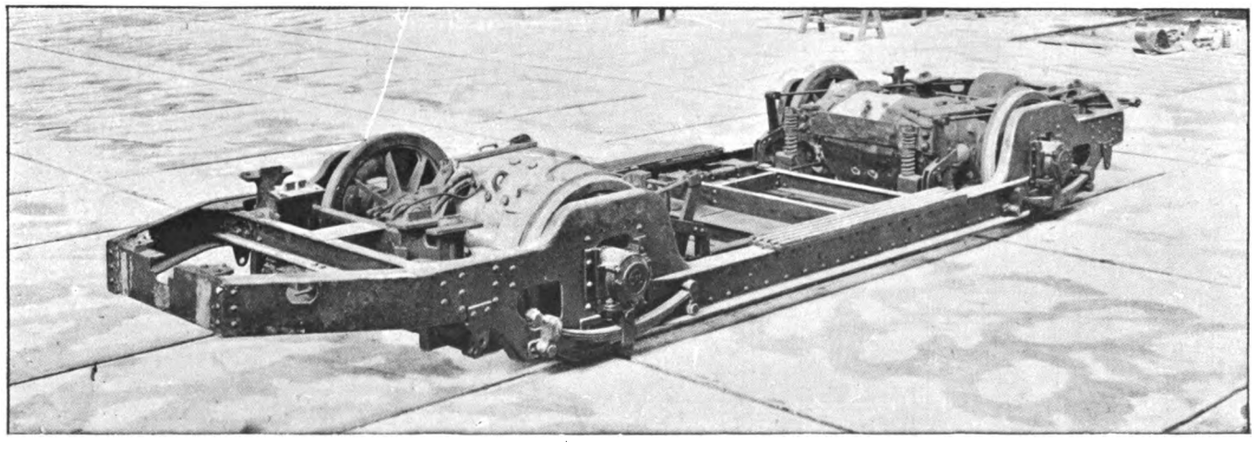

Fig. 11.—Long Wheel Base Truck—Paris General Omnibus Company.

Compressed air is obtained from electric motor-driven compressors started and stopped automatically.

Car lighting is carried out normally by means of two circuits of nine lamps in series on each car, fed from the traction circuit. Emergency lighting is provided for by means of a small accumulator set charged from the traction circuit and feeding a special circuit, which includes the headlights and a small number of interior

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lights, in this case with metal filaments for a pressure of 10 volts. In the event of the ordinary traction circuit being interrupted through breakdown of supply, the trolley running off, or failure of contact rails on the underground conduit sections, the battery is thrown into and out of action by a special solenoid with automatic arrangement for maintaining constant

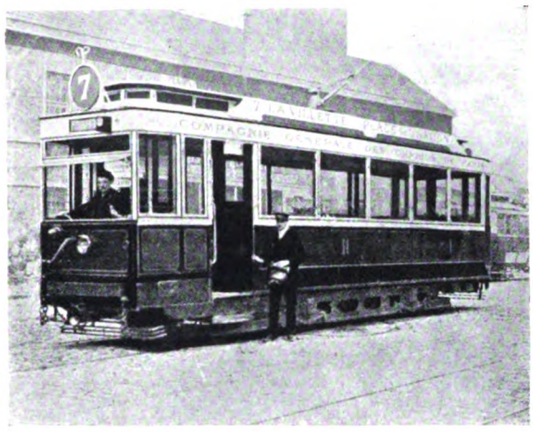

Fig. 12.—Car with Parallel Axle Truck.

polarity, an important matter on the conduit sections of the undertaking, where change of polarity is frequently necessary, and would otherwise lead to the battery being discharged into the line.

The heating of the cars is done by electricity, the current passing through the heaters being regulated so as to maintain as far as possible a temperature at

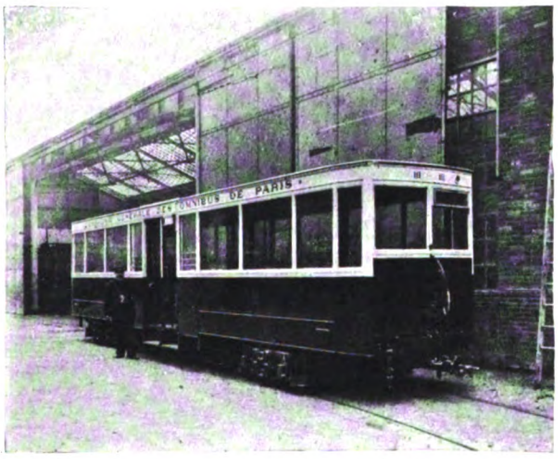

Fig. 13.—Trailer Car—Paris General Omnibus Company.

the heater face of 65 degrees above that of the surrounding air.

At the time when these details were prepared the company had actually in service a total of 1,050 cars, of which 200 were of the maximum traction type, 450 of the long wheel base type, and 400 trail cars.

FINANCING OF OVERSEAS CONTRACTS.

BOARD OF TRADE COMMITTEE APPOINTED.

The President of the Board of Trade has appointed the following committee to consider the best means of meeting the needs of British firms after the war as regards financial facilities for trade, particularly with reference to the financing of large overseas contracts and to prepare a detailed scheme for that purpose :—Lord Faringdon (chairman), Mr. B. P. Blackett, C.B., Sir W. H. Clark, C.M.G., Mr. F. Dudley Docker, C.B., Mr. G. Farrer, Mr. W. H. N. Goschen, the Right Hon. F. Huth Jackson, Mr. W. Leaf, the Hon. A. Mills, Mr. J. H. Simpson, and Mr. R. Vassar-Smith. Mr. Hartley Withers will act as secretary.

EMPLOYEES AND MILITARY SERVICE.

On June 24 there came into force the Military Service Act, which extends compulsory service to unattested married men up to the age of 41 years, unless exempted. After that date an application for exemption can only be made by the special permission of the local tribunal on special grounds, and these applications must be submitted within thirty days from June 24. Every eligible man who has not reported by July 24 will be in the position of an absentee.

Revision of the lists of reserved occupations has been made, including the cases of employees of generating stations. Two conferences took place between a deputation of the Tramways and Light Railways Association and a Board of Trade Committee on Reserved Occupations, with the result that the association has invited members in charge of generating stations to endeavour wherever possible to release men for the Services from the following occupations :—Meter readers, clerks (except chief clerks), assistant storekeepers, all cleaners employed in cleaning floors, walls, etc., in central stations, labourers (single men up to twenty-five or thirty years of age) employed on general labouring about a station, but excluding coal and ash handlers. The committee have thanked the deputation, and again urged that every effort be made to release men of military age, and that employment be given to discharged naval and military men, or to women.

Managers of a number of tramway undertakings have applied to local tribunals during the past few weeks for exemption of depot foremen, inspectors, motormen, fitters, switchboard attendants, clerks, stokers, paviors, night timekeeper, motor inspector, truck men, permanent way foremen, etc. The tramways represented included Torquay, Ramsbottom, Rawtenstall, Cheltenham, Southend, Rhondda, Wallasey, Midland Joint Committee, Chatham and District, Blackpool, St. Anne's and Lytham, Peterborough, York, Bradford, Coventry, and Nottingham. Periods ranging from one to four months were granted in many of the applications, and the manager at Peterborough was allowed six months. As it will be impossible to replace the great majority of the motormen, services will have to be reduced in the event of tribunals refusing to entertain applications for further exemptions. At Nottingham, for instance, only a month was granted to 21 motormen, all of whom are married, two older men being given three and four months.

The Coventry Tribunal suggested further reduction of the service. Mr. T. R. Whitehead replied that the department had to scheme to maintain the existing service with the help of fifteen voluntary drivers. The tribunal referred the list to the military representative for further consideration.

Brighton Corporation are endeavouring to solve the problem by following the example of Newcastle, Bradford, Birmingham, and Coventry, where a number of citizens have come forward to be trained as motormen. These drivers work in the early morning, in the evening, or on Sundays, and have performed very useful service. Mr. W. Marsh, the Brighton manager, has called for two dozen volunteers, and they will receive payment.

Glasgow Tramways Department continues to add to the number of stalwart women who are driving cars. At the end of May 106 women were so employed.

To the comparatively small number of tramways that have been able to come under the Munitions of War Act, 1916, the Aberdeen undertaking has now to be added. One result is that there are provisions to prevent strikes or lock-outs, while no employees can take up other employment until they are given a certificate of discharge.

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FRONT EXIT CARS AT AYR.

The advantages of the front exit are at length being recognised. We have on various occasions called attention to the saving of time which would be effected if tramcar passengers were to leave from the driver's end of the car, thus freeing the other end for passengers entering. The Board of Trade do not now persist in objecting to this arrangement, as experience has shown that it is no more dangerous than the old method. In fact, the latter is more dangerous for the passengers entering, because they have to stand in the roadway waiting till all the passengers leaving have got out, and during that period they face the risk of being run down by some careless driver. The scheme whereby passengers leave by the front platform requires, of course, some modification of the car. The part of the front dashboard on the near side has to be removed, and a step provided, and in many cases the stair will have to be altered. The platforms then become somewhat similar to those of the old horse-cars, which were open on both sides. A movable bar or other barrier can be fitted to close the exits on the side of the car which for the time being is the off side. It is perhaps because of the changes required in the rolling stock that the front exit has not been more widely adopted in this country. In our issue of April 13 last appeared an illustrated description of the single-deck cars in Newcastle as modified by the addition of a front exit. We are now enabled, by the courtesy of Mr. W. Grant, general manager of Ayr Corporation

Exit under Stairway Closed by Bar.

Tramways, to give illustrations showing how the front exit scheme has been carried out on some of the top deck cars at Ayr.

It is remarkable to find, in a description of a car built by the J. G. Brill Company for the Santiago Tramways, Chili, which appeared in our issue of April 5th, 1906, the following passage :—" Entrances are provided on both sides of the platform. The platform step facing the deck stairs is twice the width of that on the opposite side." These words apply perfectly to the Ayr car, as may be seen from the drawings on page 27, in which are set out principal

Front Exit Car—Ayr Tramways.

dimensions, etc. An inspection of these and of the reproductions of photographs will make the whole arrangement perfectly clear.

Mr. Grant describes the scheme as a double exit one. He has found the double exits to be of very great assistance during the heavy rush traffic in the summer season, and at the time of the Ayr race meetings. The normal traffic in Ayr is not very great, but at times, owing to the number of visitors, it becomes almost overwhelming.

STATE REGULATION OF COAL CONTRACTS.

An Order in Council, published in a supplement to the *London Gazette* on June 29, provides for the addition of the following to the Defence of the Realm regulations :—

It shall be lawful for the Admiralty or Army Council, or the Minister of Munitions, or any person authorised by them to act in their behalf, after consultation with the Board of Trade, to give directions as to the priority to be given the execution of orders, or contracts for the supply of coal or coke with a view to securing precedence for orders, or contracts, in accordance with their national importance, and the owner, agent, or manager of any mine, or any other person affected by the directions who fails to comply with any direction so given, and any person who in any certificate or document given, or issued, for the purpose of securing priority for any order or contract in pursuance of such directions, makes any false statement or false representations, shall be guilty of an offence against these regulations.

COAL SUPPLY TO PUBLIC UNDERTAKINGS.

The Board of Trade on June 29 received a deputation representing gas and electricity undertakings in reference to the difficulty of obtaining coal and in making contracts at suitable prices. Mr. Marwood replied that the Board were prepared, if approached, to use their influence with the District Coal Committees and to see that prices were justified by the Price of Coal (Limitation) Act.

ENGINEERING TRADES AFTER THE WAR.

The Board of Trade announces that in view of the wide range of the industries included within the scope of the committee appointed to deal with the position of the iron, steel, and engineering trades after the war, the president has sub-divided the work between the two following committees :—

ENGINEERING TRADES.—Sir Clarendon Hyde (chairman), Mr. A. Balfour (Sheffield), Mr. H. J. Hobson, Mr. W. B. Lang, Sir Hallewell Rogers, Mr. H. B. Rowell, and Mr. D. Vickers. Mr. A. F. Ilsley will act as secretary.

IRON AND STEEL TRADES.—Mr. G. Scoby Smith (chairman), Sir Hugh Bell, Messrs. A. Colville, J. Cox, J. Garvin, G. M. Ritchie, H. Summers, and B. Talbot, Mr. C. R. Woods, of Bradford, acting as secretary.

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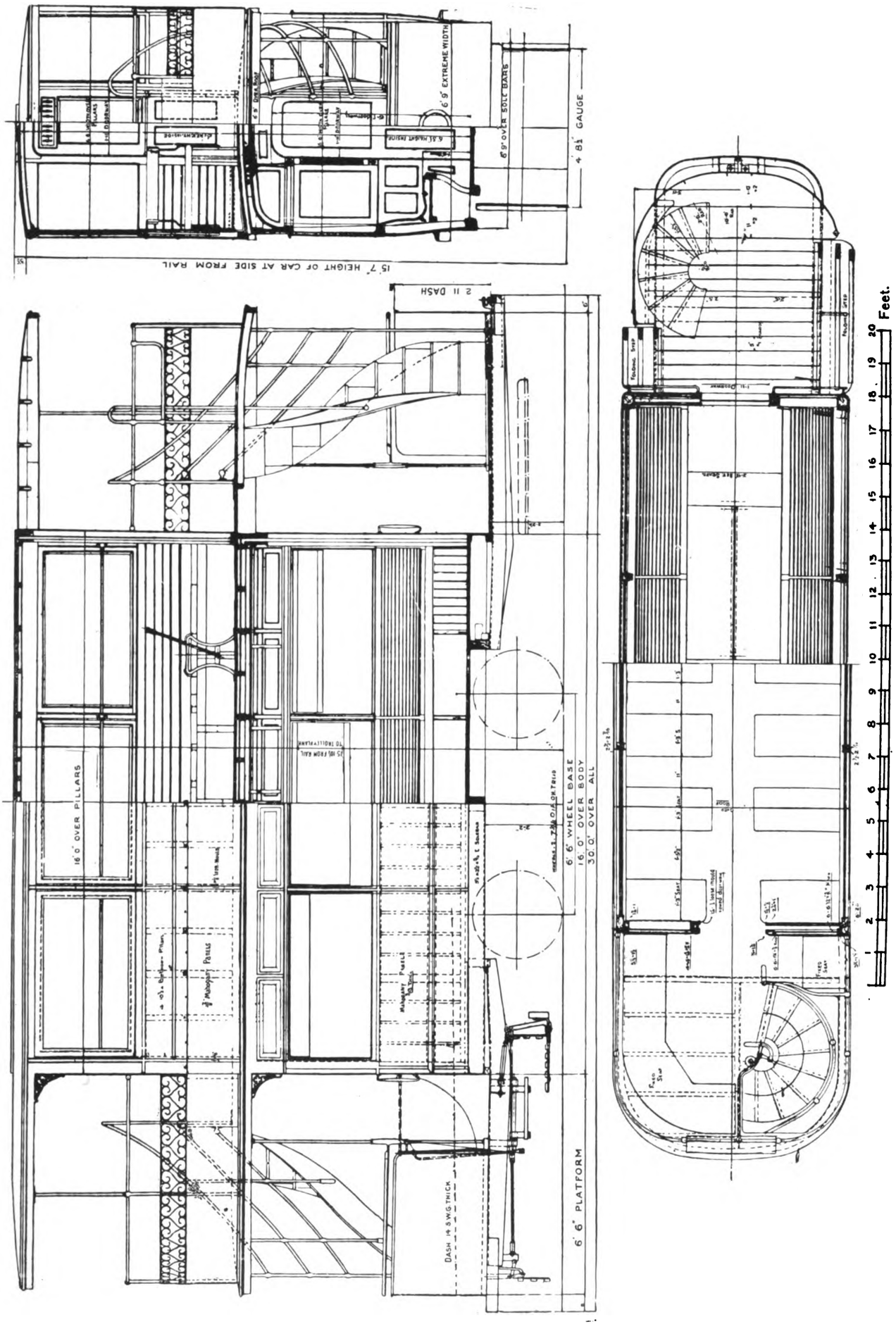
6' 6" EXTREME WIDTH
6' 5" OVER SOLE BARS
4' 8½" GAUGE
15' 7" HEIGHT OF CAR AT SIDE FROM RAIL
2 11 DASH
16' 0" OVER PILLARS
6' 6" WHEEL BASE
16' 0" OVER BODY
30' 0" OVER ALL
6' 6" PLATFORM
DASH 14 S.W.G. THICK
Feet.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Elevation and Plan of Ayr Corporation Car with Front Exit.

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The Comfort of the Passenger.

Within its purposely limited scope the annual conference of the Tramways and Light Railway Association, held on June 30, was eminently successful. The proceedings lasted only a few hours, but the comments of members from all parts of the country indicated that the occasion provided sufficient of interest and stimulus to make attendance well worth the effort required in these days of stress to cope with anything beyond the daily task. How difficult routine work has become was clearly indicated in the interesting review of the year's activity given by Mr. Arthur Stanley, which will be found in full in the following pages. It is a record that shows how great services the Association continues to perform for the industry. The single session permitted only one paper to be read, and it was fitting that that should present some departure. It was the comfort of the passenger viewed more or less from the public standpoint to which Mr. Robson invited consideration, instead of to some point of tramway administration from within. That is not to say that the comfort of the passenger is not considered in ordinary tramway deliberations. Tracing matters back to fundamentals, all tramway engineering and operation are directed first to the conveyance of the passenger, and second to his comfort. Thus indirectly the comfort aspect lurks consciously or unconsciously at the root of most tramway problems; for the greater the comfort the greater the inducement to the public to use the cars. Nevertheless the placing of this question of comfort in the foreground, and the consideration of all other tramway questions as a means to this end, was as novel as it was praiseworthy. Mr. Robson's paper opened by the bold assertion that the comfort of the passenger has not always been sufficiently considered, and the value of the numerous suggestions which he made is undeniable. We can refer here to only a very few of them; readers may study the full text of the paper and the discussion thereon elsewhere in this issue. The condition of the track is a point of the utmost importance for the comfort of the passenger. It is true that during the war it is not practicable to indulge in extensive track renewals, but Mr. Robson was, no doubt, looking to the time when normal conditions will be restored. A good deal can be said for improvements in trucks and brakes, but that means special expenditure, which on any extensive scale must also be postponed. It is unfortunate that powerful brakes capable of being applied by the exercise of very little muscular effort on the part of the driver are not more extensively in use. A brake of the kind would be specially welcome at the present time.

* * * * *

Mr. Robson advocated cross seats on the lower deck instead of longitudinal ones, both as being more comfortable and because they more readily insure the full occupation of the seating capacity. In the discussion, Mr. Hatton, of Newcastle, pointed out that on his system they had to change cross seats to longitudinal in order to allow room for more standing passengers. Of course that does not promote the comfort of the passenger, and it may be regarded as a war emergency expedient. There can be no question that Mr. Robson's advocacy of rattan spring seating instead of hard wood will meet with approval, especially for those lines where the track is not all that it should be in peace times. One of the most important improvements advocated was the front platform near-side exit. Mr. Robson's remarks in favour of this arrangement met with general favour.

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It has often in the past been advocated in these pages; and now that Board of Trade restrictions have been withdrawn, we ought to see the reform widely carried out. With most types of car the alterations required would not be very expensive. Such an arrangement certainly adds immensely both to the comfort and safety of the passenger, and it also cuts down the duration of stops at busy points enormously. Mr. Hatton, who, as described in a recent issue, has already adopted the idea, was able from experience to testify to the great value of the front exit. He added there had not been a single accident associated with the front exit cars, and that as soon as labour conditions permitted more cars are to be adapted. It was surely by irony or grim humour that in a discussion on the comfort of the passenger the question of cars with no seats at all should have been mooted by one or two members. The object of this proposal is to enable more passengers per car to be carried in munition areas, the workmen all standing and packed together as close as may be. The idea, like many other expedients now forced upon us, has its value in war time, but is not expected to have an enduring popularity in happier days. Mr. Robson's paper contained many interesting suggestions for improving the internal appearance and the ventilation of cars, and prompt attention should also be given to his proposal for the abolition of unnecessary stopping places. That is a reform that will be of value for all time. Shorter running time is an advantage well worth the sacrifice entailed by a little more pedestrianism.

More Efficient Training.

The representatives of tramway and omnibus undertakings who visited the training school of the London General Omnibus Company could not have come away without feeling grateful to Mr. H. E. Blain, the operating manager of the Omnibus and Underground Companies, for the opportunity of learning what is being done by these great companies in securing the safety of the public. Never in the history of the Tramway and Light Railway Association has a more instructive two hours been spent than on the occasion of the visit to the Milman Street training depot. Those who enjoyed that privilege owe a duty to their undertakings and to the public to see that the work which has been so well initiated by Mr. Blain is carried to full fruition elsewhere. In other words, the use of the cinematograph in the imparting of safety lessons to employees and increasing their general efficiency, ought to be taken up under the joint auspices of the Tramways and Light Railways Association and of the Municipal Tramways Association. With the aid of the tramways companies of the London Traffic Group, the L.G.O. Company have rendered a public service in a double sense. First there is the triple benefit to public passenger undertakings, to the users of their vehicles, and to the general public arising from the inculcation of "safety first" principles. Secondly, the films serve to revive traffic observances that were in danger of being forgotten. We refer to the rules of the road for tramcars and omnibuses. The omnibus driver has not always paid heed to the rule requiring a driver to extend his arm when he is about to pull up or to turn a corner; in London nowadays this precaution is seldom forgotten. A plea has often been advanced that tramcar drivers should be provided with mechanical means of giving a signal. While the suggestion may not be a feasible one, there is no reason why conductors should not extend an arm whenever they ring the stopping bell from their platform. We are convinced that the use of films for the instruction of tramway employees has only to be mentioned for a joint committee to be appointed, and that the result of their labours would prove as satisfactory as the work of Mr. Blain and his assistants has been. The testimony of the Omnibus Company is doubly favourable. The films have been of service in teaching drivers and conductors to become more quickly efficient in this period of stress, and there has been a marked diminution in the number of accidents in which their vehicles have been involved. This means a gain to the public as well as to the coffers of the company. The management, indeed, may claim to have beaten the Americans in the thoroughness of their work; for the reduction of accidents has exceeded the rate recorded in the case of the electric railway that last year won the medal given for annual competition in the United States.

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TRADE AFTER THE WAR.

Success of the Economic Conference.

The International Economic Conference of the Allies in Paris was more successful than the most sanguine had ventured to hope. The momentous resolutions at which it unanimously arrived will have far-reaching consequences, and must greatly encourage those who are not unnaturally anxious as to the course of trade development after the war. The resolutions are more definite, more favourable to the fostering of the trade of Britain and her Allies, more opposed to any resumption of German trade permeation and domination than could confidently have been looked for. Of the determined attitude of the representatives of our Allies there was no doubt; the question was whether the British delegates would back them up fully, seeing that a large proportion of the members of His Majesty's Government are—or shall we say have been—pronounced doctrinaire free traders. But not only did the British delegates support the views of their foreign colleagues—they did more; they took an active part in formulating policy in that they framed some of the resolutions. It is plain that our Government have fully realised that old fiscal controversies are dead, that the question is not one of free trade versus protection, but that it is a question of self-preservation, of the preservation of British industries against keen, insidious, and malignant competition with hostile political motives behind it. The benefit which has accrued from Mr. Hughes and Mr. Bonar Law being included among the British representatives is probably greater than can be estimated.

Several members of the Government had from time to time indicated, though in very general terms, that they realised that the old *regime* had passed away, and that things must be looked at in a new light. The Prime Minister himself, speaking at Ladybank on June 14, the day of the opening of the conference and just a week before the resolutions of the conference were made public, used these words in regard to the relations of the mother country and the dominions:—

> With such an Imperial record it will never be possible, in my judgment, to revert to our old methods of counsel and of government. The fabric of the Empire will have to be refashioned and the relations, not only between Great Britain and Ireland, but between the United Kingdom and our Dominions, will of necessity be brought under close and connected review.

That related more particularly to Imperial government, but in that Imperial trade is involved.

The Resolutions and Their Application.

We may pass over the resolutions for prohibiting trading with the enemy during the war and for tightening the blockade. These are as a matter of course. Quite admirable also are the resolutions for transitory measures of trade reconstruction of the allied countries. Among these it should be noted that none of the Allies are to be hampered by any claim put forward by the enemy Powers to most-favoured-nation treatment. To prevent dumping during the transitory period the Allies are to fix a length of time during which the commerce of the enemy Powers shall be submitted to special treatment. Most important are the permanent measures of mutual assistance and collaboration among the Allies. The latter are to render themselves independent of enemy countries as regards raw materials, manufactured articles, and financial, commercial, and maritime organisation. Among means suggested are subsidies of enterprises, financial assistance for the encouragement of scientific and technical research, and the development of national industries and resources, and customs duties or prohibition. The Allies are to adopt such measures as may seem to them most suitable for the purpose, having regard to the principles which govern their economic policy. Other resolutions are designed to facilitate mutual trade relations, to assimilate patent laws, and to unify the efforts of the Allies in other ways.

The question now is, what application is to be made of the resolutions? Here we would single out at once the rock on which this country may possibly split if the old fiscal theories are allowed to have weight. It lies in the words quoted above, "having regard to the principles which govern their economic policy." The resolutions at present are not binding on any of the allied Governments. They have to be considered by them, and in so far as approved some of them at least will require legislation which means the approval of specific means by the Legislatures concerned. France has already accepted the resolutions, and it does not appear likely that there will be difficulty so far as the other Allies are concerned; but it yet remains to be seen how far our Government will adopt the crucial proposal to which the quoted words apply. If it is decided to adopt the resolution, the exact nature of the concrete proposals following thereon may afford a field for controversy. However, the country, Parliament, and even the Government, have travelled so far since this war began that one may believe they will not hesitate to take strong steps to preserve and develop trade and all our industries. The Government should take to heart the advice of Mr. Hughes. That may be summed up in the words prompt and decided action. And there is good hope, because Mr. Bonar Law says he is certain that the resolutions will be adopted by the Government and the House of Commons.

Close of Mr. Hughes's Visit.

The visit of Mr. Hughes, the Premier of Australia, has come to an end, and it has truly been a remarkable mission. When he arrived a few months ago he was comparatively unknown in this country; he leaves it one of the best-known and admired of our Imperial statesmen. He has been a vivifying force among us in stirring up the Imperial spirit, and in urging the necessity of trade organisation and development so as to resist German encroachment. Lord Rosebery has described him as a hurricane speaker. He is a Labour leader and he is a Protectionist—a combination strange to the British working man. He has addressed trade unionists, manufacturers, traders, politicians, and has everywhere been received with enthusiasm. His empire-building ideas have awakened a responsive chord everywhere. The enthusiastic farewell which Mr. Hughes received at a dinner given by the Australians of London on June 23 afforded Mr. Bonar Law the opportunity, in a warmly eulogistic speech, to make the statement mentioned above that the Government and the House of Commons will adopt the conference resolutions. Mr. Hughes, in his reply, also expressed the belief that the conference resolutions will be carried into effect, and that they will contribute to the making of the greatest economic alliance the world has ever seen. It was made plain also from the speeches that the home and dominion Governments will also take care of the question of a closer Imperial unity, just as Mr. Asquith, in the passage already quoted, foreshadowed a Parliament and Government for the whole Empire.

The British Engineers' Association has made a strong appeal to all engineering firms to combine for the better organisation of the industry after the war. It already includes over 300 firms. The Association will urge the Government to place the industry in a position to compete successfully with enemy countries after peace has been restored.

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Tramways and Light Railways Association

Eighth Annual Congress, held in London, June 30, 1916.

The annual general meeting and congress of the Tramways and Light Railways Association were held on Friday, June 30, 1916, at the Westminster Palace Hotel. The Hon. Arthur Stanley, M.P., chairman of the Council, presided, and there was a fair attendance of members. The Secretary, Mr. A. de Turckheim, having read the notice convening the meeting and the auditor's certificate, the Chairman moved the adoption of the report and accounts.

The Hon. Arthur Stanley's Address.

The Chairman said:—We have followed last year's precedent and confined our annual congress to one day instead of making it a two or three days' gathering as in pre-war times. As most of you are very busy, we decided to take the business meeting in the afternoon, so as to enable some of our out-of-town members to travel up in the morning, and as we are having our informal dinner to-night—my friend, Mr. England, reminds me that there are to be no speeches—they will only have to spend one night away from home, which is a good thing for everybody, and I hope that these arrangements will meet with their convenience. I extend to you all a hearty welcome, and I trust that our meeting to-day may prove a pleasant as well as an instructive one. I am much pleased to see Mr. Bellamy here, the son of my old friend the late Mr. Bellamy, of Liverpool, who introduced me to the tramway world; he has been through the whole of the Gallipoli affair, and we are all glad to see that he is none the worse for it. (Hear, hear.)

I will now proceed to make a few remarks on the report and accounts. The revenue from subscriptions amounted to £775, against £832 last year. This is a falling off of some £60, which is due to the fact that a number of our members are away on war service, and we all sincerely hope that after this war is over they will return safe and well. The expenditure for the year amounted to £635, against £822 last year, a reduction of some £180, due chiefly to the fact that we incurred no expenditure on our congress in 1915, and generally practised strict economy all round. Adding £14, being interest on bank deposit and War Loan, and writing off some £30 on subscription account, we show a net excess of revenue over expenditure of £125 15s. 9d. during 1915; this, added to the credit balance brought forward from previous years, gives us a total balance of £430 to carry forward. (Hear, hear.) As I told you last year, £300 of this we invested in 4½ per cent. Government War Loan. I fear that the current year will show a further falling off in our subscriptions, but as long as we can keep our receipts higher than our expenditure we shall be all right. It is difficult to secure new members under present conditions, but if any of you can induce some of your friends to join the association you will be assisting us very much. There are still a great many men connected with the industry who so far have not joined us.

I have again to refer to the loss of some old friends since our last meeting. One of our very earliest members, Sir Charles Rivers-Wilson, died a few months ago. You will all remember that he was our first president in 1897, and to the last he took a lively interest in our affairs, although owing to his great age, 85, he did not take any active interest in our work during the last few years. We have lost also Mr. Robert Hammond, one of the pioneers, who assisted at our last congress at Newcastle. We extend our heartfelt sympathy to their relatives, to whom suitable letters of condolence were sent at the time. I should like to add one word of sympathy and congratulation to our old friend, Mr. Fell, who happily is now recovering from a long and severe illness. I hope we shall very soon see him among us again. (Hear, hear.)

Coming back to the affairs of the association, I think that it is a matter of congratulation that after a year and a half of war and of difficult conditions, we should still have been able to add £125 to our reserve fund. Although we have not made a great stir we have been active in many directions. Owing to the war, new conditions have arisen, new legislation has been passed, and many circumstances affecting our business have had to be met and dealt with. The most serious problem to confront us perhaps was the loss of employees. Certainly I think we may pride ourselves on the fact that the tramway industry has done its share in providing the nation with men to fight its battles. On some systems 40, 50, and 60 per cent. of the staffs joined H.M. forces, or some department connected with the war, and managers had to do the best they could to find substitutes or to work their systems with greatly reduced staffs. Much confusion arose in the early days owing to the establishment of various public bodies, committees, etc, to deal with recruiting, and it was not always easy to know who were the proper authorities to approach with a view to retaining indispensable men. We felt that in other ways, too, but matters have settled down now, and we know where we stand. The question of employing women conductors was faced some time ago, and they are now in almost universal use with, I am told, satisfactory results. Indeed, women are now taking the place of men as drivers on some of our systems where traffic is not very dense, and where there are no gradients or complications of brakes. That they will come into general use as drivers does not seem at all likely. Driving a tramcar is a very different thing from driving a motor car; the strain is not one which should be placed upon women, nor would it be to the public safety.

The supply of materials has engaged our serious attention, and we were fortunate in being able to arrive at a satisfactory arrangement with a committee of manufacturers for the delivery of steel tires. The question of rails is more difficult, and is engaging the attention of one of our committees. Then there is the question of supplies of paper for tramway tickets. In this matter we acted with the Association of Motor Omnibuses, and we hoped to be able jointly to convince the members of the Royal Commission on Paper that an exception should be made in the case of paper manufacturers supplying tramway and omnibus tickets, and that the Royal Commission would grant them a licence guaranteeing a greater import than two-thirds of the quantity imported in 1914. In this we were disappointed, the Commission having refused to receive our joint deputation which proposed to state our case. Our committee consulted with the various ticket makers, with the object of finding a way out of the difficulty, and we recommended to our members, as the only means of economising paper, to endeavour wherever possible, to reduce the size of their tickets. I believe that this is pretty generally being done. Then there is our old friend, the Finance (No. 2) Act, 1915, and excess profits. I suppose that most of you spent many weary hours over this puzzling Act. After much discussion and voluminous correspondence, the association decided to make formal application to the Board of Referees on behalf of its company tramway members under Section 42 for an increase of the statutory percentage from 6 per cent. to 12 per cent. We think this is a fair percentage in the case of undertakings having a limited tenure, and our committee of experts are prepared to substantiate our contention if called upon to do so. The matter is under consideration at the present time.

At a meeting such as this, I think reference should be made to a piece of legislation which, although not dealing with tramways, will, I think, affect a good many of us; I mean the Local Government (Emergency Provisions) Bill, 1916, Section 20 of which prohibits the establishment of new routes for motor omnibuses without the consent of the highway authority, or where such consent is unreasonably refused, without the consent of the Local Government Board. Well, gentlemen, there may be differences of opinion in this room as to the merits of this section. We all know the old veto which has so long been a thorn in our tramway side, and we can extend, perhaps, some sympathy to a kindred industry on the birth of this new veto. Where I think we as tramway men can all agree is on this point—if the motor omnibus business is to be made to contribute towards the maintenance of roads, it would only be fair to include all heavy commercial vehicles, which cause far greater damage to the roads than motor omnibuses. Instead of piecemeal legislation we, as an association, would have preferred a general Act applying to all users of the roads, and apportioning to each section of traffic its fair proportion of the cost of maintenance. It is impossible to take up a thing like this during a war. I think after the war is over, and they take the question into consideration in the various departments, we ought to concentrate on this point, and see that the burden of the cost of the roads is fairly divided among all those who use the roads. At any rate, we have been able to work harmoniously with the various motor omnibus interests; of course many tramway undertakings to-day own and run motor omnibuses.

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I now wish to refer more particularly to the case of allowances for depreciation of motor omnibuses for income-tax purposes. A joint committee, consisting of members of our association, the Municipal Tramways Association, the two Motor Omnibus Associations, and the Association of Municipal Treasurers, under the chairmanship of Mr. Howley, a member of our council, after many months of hard work submitted their report to the authorities at Somerset House, and we all hope that as a result of that report we shall obtain a standard method of assessment for motor omnibuses, in the same way as we obtained a standard method for tramways some few years ago. The Board of Trade have recently appointed an Electrical Committee to go into the whole question of the condition of the electrical industry, and to hear evidence. I think you will like me to extend our sincere congratulations to our late vice-chairman, Mr. James Devonshire, upon his appointment as a member of that committee. (Hear, hear.) I do not think they could possibly have selected a better man or one better qualified for the position than Mr. Devonshire, and I think we have to congratulate ourselves and the committee on his selection. Mr. Devonshire has devoted many years to the interests of electricity, both in regard to tramways and to power supply. The council think it is most important that the tramway industry should be represented at the inquiry now being held by the Electrical Committee, and I wish to propose to the meeting that Mr. Stephen Sellon should be invited to give evidence on our behalf. (Applause.) Mr. Sellon has spent over 30 years in the tramway business, and it may safely be said that what he does not know about it is not worth knowing. Our interests will be in safe hands, and I hope you will all agree to my proposal, and that Mr. Sellon will consent to accept the task. (Hear, hear.) I think that brings me to the end of my remarks. You will all realise that I have not been able to give very much personal attention to the work of the association this year, but thanks to our very admirable secretary, Mr. de Turckheim, I have been posted as to what has been going on. I should like to say again that I think it is a most satisfactory thing in a year like this that we should be able to show such good results. If the society can weather 22 or 23 months such as we have had since the outbreak of the war, I think it shows that we are in a very strong and flourishing condition. I now beg formally to move "That the report and statement of accounts for the year ended December 31, 1915, be approved and passed." I will ask Mr. England to second that, and after that if there are any questions I will try and answer them. (Applause.)

Mr. HARRY ENGLAND.—I have much pleasure in seconding the adoption of the report.

There were no questions, and the motion was carried unanimously.

The CHAIRMAN.—Our Articles of Association require that one-third of our members of council should retire for a period of at least one year, and those who retire to-day are Messrs. Shirreff Hilton, Baker, Dugdale, Goodyer, Williams, and J. Cameron. We thank them very much indeed for the assistance they have given us during the last three years. We are always very sorry to part with old friends on the council, and we hope to see them back again on the council at the earliest possible stage. Your council have unanimously decided to recommend for election to these vacancies the following gentlemen :—Mr. A. H. Beatty, of Messrs. Balfour, Beatty and Company. I deeply regret to hear from our secretary that Mr. Beatty lost his son at the front some few days ago ; I am sure you will wish me to convey the most heartfelt sympathy of this meeting to Mr. Beatty and his family. (Hear, hear.) Mr. Bulfin, general manager of the Bournemouth Corporation Tramways ; Mr. Vincent Edwards, general manager of the Hastings and District Tramways Company ; Mr. A. W. A. Chivers, British Electrical Federation, Limited ; Mr. H. M. Sayers, consulting engineer, an old colleague whom we welcome back to this country ; and Mr. G. M. Harriss, the new general manager of the Dublin United Tramways Company, whom we congratulate on his recent promotion, and we congratulate him still further on the fact that his tramways did not suffer, or were not badly damaged, during the late riots. We welcome these gentlemen, whose assistance in our work in the future will be valuable. Is it your pleasure that we elect the six gentlemen whose names I have mentioned *en bloc ?* If so, I move that they be elected members of the council.

Mr. A. V. MASON formally seconded, and the motion was carried unanimously.

The CHAIRMAN.—The next resolution, for the appointment of auditor, should be proposed by a member of the association.

Mr. J. W. DUGDALE moved "That Mr. A. W. Chambers, the retiring hon. auditor, be re-elected for the ensuing year, and that the thanks of the association be given to Mr. Chambers for so kindly placing his valuable services at our disposal."

Mr. C. W. SHEPHERD formally seconded, and the motion was agreed to unanimously.

The CHAIRMAN.—I have now to ask that you will be good enough to excuse me ; I have another meeting to attend, and I am only too sorry that I cannot wait to hear Mr. Robson's paper, but I hope to have the pleasure of meeting you all at dinner this evening.

Mr. HARRY ENGLAND, vice-chairman of the association, then took the chair, and called upon Mr. Robson, who read the following paper :—

TRAMWAY TRANSIT AND COMFORT:
A PLEA FOR THE PASSENGER.

By W. TUKE ROBSON

(*General Manager, Southampton Corporation Tramways*).

In dealing with a subject not strictly connected with war time difficulties, I feel that an apology is perhaps needed, but I am sure that all those engaged in the control of tramway undertakings will feel with me that to attempt to write a paper on the complexities and difficulties of the present time would be a gigantic task, and one which could not be adequately dealt with in the short space of time available. Each undertaking is bravely engaged in fighting its own battles, and the publicity afforded by the generous assistance of the Tramway Press and the two Tramway Associations cannot be too highly praised. Moreover, the subject of this short paper is not wholly dissociated with the present situation when one considers the necessity for increasing the life of existing permanent way, and also the fact that the termination of the war will mean, in many cases, the acquiring of new rolling stock. This will afford tramway authorities a glorious opportunity of striking out new lines in directions free from hide-bound obsolete design.

Personally I feel that the opportunity to escape for even an hour from the vagaries of the woman conductor, and the wiles of the war bonus, will be warmly welcomed by those of us who are visibly ageing through the strain and stress of war time tramway administration.

The object of this paper is to endeavour to point out that the passenger has not always been sufficiently considered in the prosperous times of the past. He has had a cheap ride it is true, but not always a comfortable one, and in making plans for the future it might be well to consider how his comfort may be increased, not particularly because he deserves it, but because by such means he might be induced to ride more often.

THE TRACK.

Just before the outbreak of war I rode down a steep hill on a certain tramway system in the upper saloon of a car. The speed was not particularly excessive, but the condition of the track, together with the condition of the car, turned that ride into a species of nightmare. We were hurled from side to side as the car rocked and bumped its way downwards, and by a merciful Providence reached the bottom, bruised but whole, with that feeling of thankfulness which I imagine one would experience after successfully emerging from a railway collision.

On reaching home I looked up the annual report of this undertaking, and found that the sum of, roughly, £20,000 had been allocated to the relief of rates out of the surplus profits in the last four years alone. A small proportion of this amount would have been much better spent in track renewals.

At the present time track renewals are difficult, if not impossible, but much can be done in the way of repairs of a permanent nature. It is surprising that so many systems have not done more to abolish hammered joints, considering the facilities which exist in the way of thermit and arc welding. There has been, I am afraid, a tendency to patch up, instead of getting rid of the trouble once and for all by effecting a lasting and permanent abolition. The impossibility of obtaining new rails at present should only serve to wake us to the necessity of increasing the life of existing track by one or other of the means which are at our disposal, and at the same time dispose of a great deal of the disturbing noise which so many systems suffer from.

RAIL CLEANING.

The question of rail groove cleaning has never received the consideration which is due to this method of reducing noise, and in the only town where I have personally known it to be systematically carried out, the beneficial effect caused by throwing the refuse out of the groove on to the paving was modified by the intense irritation which this well-meaning policy caused the borough engineer. One hopes that in the near future vacuum cleaning will bring about the desired result.

TRUCKS.

It is, however, in the direction of rolling stock that the hopes of a passenger desiring a more comfortable ride must principally be centred, and one cannot help feeling that the design of the tramway truck has not kept pace with that of railway practice in this respect. We are mounting our cars on practically the same truck as we did fifteen years ago, and although we may add various devices in the hope of gaining flexibility and radial action, it must nevertheless be admitted that a really comfortable riding truck is not yet an accomplished fact.

BRAKES.

One thing in particular always strikes one—that the principle of the hand-brake should show practically no improvement in all the years that have passed. To all intents and purposes it is the same brake as on the horse-cars twenty years ago, and the unpleasant jarring action is only intensified by the greater speed and weight of the modern car, to say nothing of the extra elbow grease required by the operator. The various devices of inserted gearing have

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relieved this to a certain extent, but have not improved things from the point of view of those travelling in the car. An interesting experiment is being made at Huddersfield at the present time, in the nature of a brake drum-keyed on an extended armature shaft in the same way as the pinion, with a Ferodo-lined band-brake operated in the usual way by means of the brake spindle. The advantages of such a brake are obvious, and in actual practice it is proving a great success. I am indebted to Mr. R. H. Wilkinson, the general manager at Huddersfield, for the opportunity of inspecting this brake of his design, and for permission to mention it in this paper. There would appear to be quite a movement in the direction of improved brakes at the present time, and similar efforts should be applied to the whole truck. It is quite certain that the easy, comfortable ride one obtains in modern electric railways serves to show the need of improvement in tramway truck design.

Seating.

The longitudinal seating of the usual British car, and the wearisome cry of " Move up, please," or " Sit closer together, please," makes one wonder why the use of cross-seats in the lower saloon has never become more common. The advantage of being able to tell at a glance if any seat is available is very obvious, and there is no sacrifice of capacity, as those who have had experience can testify. A 24-passenger cross-seat car holds 24, whereas on a longitudinal-seated car the best conductor often is unable to induce, say, 22 passengers to move up and make room for 24. There is infinitely more comfort in facing the direction in which the car is travelling and in being able to look out of the window without twisting one's neck into a species of spiral. Moreover, the painful situation, which has been known to occur through a passenger being compelled to sit and stare at someone whom he dislikes intensely on the opposite seat, becomes agreeably impossible in a transverse seat car. Staring at one's fellow travellers can easily become a habit, and I know one town in particular where every fresh passenger is made to run the gauntlet of so many pairs of eyes, to the great discomfort of sensitive people. I would warmly recommend this type of seat to those who are considering the question of new rolling stock. The question of gauge is not an obstacle, as cross-seats have been most successfully adopted at West Hartlepool, a narrow gauge system.

Seat Cushions.

Before leaving the question of seating, is it not time that the uncomfortably hard wood seat was superseded by something more comfortable to sit upon? In the old days wool mats and rep cushions were used with insanitary success, but now that natural glaze rattan spring seatings are available, there is no reason why every bad joint, point and crossing, should be punctuated with disturbing regularity upon the tender portion of one's anatomy.

Ventilation.

The question of providing adequate ventilation without undue draught has long been one of the problems of tramway management, and it is, I think, quite evident that ventilators should be fixed and not subject to the whim of any passenger. Even on the hottest day there is always someone ready to shut out fresh air if allowed to do so, and the best method I have yet found is to arrange the ventilator windows to open outwards on a quadrant, in the direction in which the car is travelling. A stop is provided with quadrant to prevent the entire closing of the frame, and a thumbscrew holds the ventilator open to the fullest extent in the summer time.

In the old-fashioned car, which has no ventilator windows, a good plan is to insert wire gauze at the top of the door window. This simple arrangement is most effective in providing fresh air just where it is required, without perceptible draught.

Experiments have been made with induced draught by means of a fan driven from the axle, and there would appear to be no reason why this method should not be adopted with success. The atmosphere of most cars on Saturday nights certainly suggests the desirability of providing far more adequate ventilation than has hitherto been adopted.

Exits.

The tendency of passengers to sit as near as possible to the rear end of the car in order to get out more easily is only natural, and it is quite evident that any arrangement whereby a passenger may alight from the near side of the front platform would both add to his comfort and also make the conductor's duties easier. There would appear to be difficulties in the way of ticket checking, and also by reason of the staircase at the front end, although this can be overcome by an adaptation of the reversed stairway on a slightly extended platform. It would be interesting to hear the experience of Newcastle and other places where experiments in this direction have been made. From the passenger's point of view it must be one of his greatest grievances that, after nobly doing his duty and taking a seat at the front of the car, in order to leave room for those entering after him, he should be compelled to fight his way back to the rear in order to alight.

Interior Finish.

From an æsthetic point of view, many car bodies I have seen built during recent years leave much to be desired. A uniform finish in teak or oak is not nearly so attractive as a contrast afforded by, say, oak and mahogany, and although the heavy elaboration of carved mouldings has given place to simpler design, there are, nevertheless, still far too many sharp corners and ledges for the accumulation of dust. In the writer's opinion, the modern car should follow the example of the modern house, and have rounded corners without mouldings and dust-traps. Instead of mirrors, more or less mottled as years go by, the end panels might well serve as frames for attractive photographs, displaying the charms of the district through which the cars run, confined as far as possible to views at the extreme ends of the routes, costing the exploring passenger the maximum fare to get there.

Top Covers.

The value of top-covered cars, especially in wet weather, is, of course, appreciated to the fullest extent, but it is not so easy to understand why the top saloon is often so much more uncomfortable and unattractive than the lower one. They are in many cases merely a sort of box top, cramped and dirty looking, apparently designed with no desire to make them attractive or easy to clean. An interior finish of alternate light and dark matchboard with sashless lazy-tong windows and tip-up seats, allowing a clear floor for cleaning, with a row of ventilator windows to match those in the lower saloon, would give a wholesome attractive effect, and would please the ordinary passenger as well as " drawing " the man who boards a top-covered car in order to have a comfortable smoke.

The seating frequently leaves much to be desired; the outside canopy seats especially are often extremely uncomfortable by reason of the absence of a back, one's shoulder-blades coming in painful contact with the iron rail surrounding the canopy platform.

Odd Fittings.

It may appear a trivial matter to criticise the position of switches and waybill racks, but everyone must have seen the surprising effect when a conductor, fiddling about over someone's head, is caught unawares on a curve and launched broadside against an unoffending passenger. This would appear to indicate the desirability of fitting all switches, racks, and articles of this description in the region of the platform, so that the conductor or inspector would not require to inconvenience or mystify passengers by these little operations, which to the lay mind are usually unnecessary.

Open Air Riding.

A year's experience of south country tramways makes one wonder if the British principle of a double-deck closed car has been too closely followed, at any rate in the south. The continental open trailer and the convenience of being allowed to stand and smoke on a roomy platform certainly appeals to one as a passenger, and the extraordinary popularity of a car on the Blackpool toast-rack principle, adopted at Southampton, certainly leaves no room for doubt as to the preference of the travelling public.

Long after the novelty had worn off passengers could be seen remaining on the car for two or three double journeys, enjoying the fresh air. One of the most noticeable features of this car is that, except in very windy weather, there is no discomfort through draught, and although the car was built as a pure experiment, the idea certainly suggests itself that trailers on this principle would be a great asset to any system requiring additional cars for summer traffic.

Shelters.

It is hardly reasonable to expect intending passengers to stand and wait in wind and rain without feeling a natural annoyance, and, while the erection of shelters with seats generally results in a form of philanthropy in providing homes for the destitute, there is no doubt that pavement verandahs are greatly appreciated, and are very useful in soothing and detaining the kind of passenger who becomes vindictive and walks home just because there does not happen to be a car exactly when he wants one.

Bill Sticking.

The practice of obscuring passengers' vision by sticking bills all over the windows has lately reached greater proportions than ever, and some of the large systems are the worst offenders in this respect. On some systems it is really difficult nowadays to see where you have got to, and the opportunity given to wags to scribble on the bills assists in the general untidiness of the car. Hanging cards are even worse, as they swing about and disarrange the hats of lady passengers. The philanthropic objects advertised in this way are very deserving, but after all windows were made to see out of, and not to be used as travelling hoardings.

Speed and Stops.

The writer once boarded a car passing through a town, and was informed by the conductor that it was hardly worth while getting on, as the car was going to wait ten minutes while he and his mate had their dinner. Such a proceeding being too much of a novelty to miss, I waited to see if such a thing could really be, and sure enough the car did wait ten minutes, not at a terminus even, but at a passing place quite near the centre of the system. We have read that standing cars gather no passengers, and this one certainly did not. Such a case as this is, I trust, unique, and the growing tendency to improve the time-table by fitting the excellent modern equipments which do so much to improve the speed on gradients

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is very acceptable to those using the cars. The war has also given us a fine opportunity of getting rid of certain unnecessary stopping places, and it will be found that the travelling public as a whole are quite pleased to find the cars getting along quicker. Many systems suffer from too many stopping places, and the excuse for remedying the evil which now offers itself is too good to miss.

Influence of Local Conditions.

It is somewhat deplorable, especially from a passenger's point of view, that on many systems some purely local obstruction should have been allowed to govern the design of the whole of the car service for future ages. Quite a number of tramway authorities have had to reduce head-room to the smallest possible limit because of one wretched bridge or archway, with the result that the curses of the travelling public have fallen upon the cars themselves, instead of the real origin of the trouble. An expenditure at the beginning in reducing the road level or otherwise removing the obstacle in the way would have been money well spent if it resulted in more roomy and comfortable rolling stock. I would go further, and say that if the comfort of the passenger had been made the first consideration the anathemas would then have been levelled at the obstruction instead of the cars, and in all probability public opinion would have done the rest.

Parcels.

Large and awkwardly shaped parcels are frequently a source of irritation to passengers, expecially when they overlap the owner and partially rest on his next door neighbour. We all know the man who brings a Gladstone bag into the car and places it behind his feet, which consequently project halfway across the gangway and trip up unwary but unoffending people. The best way of dealing with this evil is to charge for parcels beyond a certain size and weight, and insist on them being placed on one or other of the platforms.

Meals on Cars.

When travelling on a certain northern system recently the edifying sight was witnessed of the conductor "wolfing" an eight-inch teacake in one hand, and alternately drinking from a huge jug held in the other. This was not even in an outlying district, but well within the mile radius from the centre of the town. If the duty sheet will not permit of meal-time reliefs altogether, food taken on cars should be confined to something in the nature of a snack at outlying termini or away from the main streets.

Fares.

I do not propose to enter into this debatable subject at all, except to say that it is obvious that all passengers should be treated with absolute fairness and equality, with as much convenience to themselves as is possible, after providing for efficient checking. The sale of books of tickets has recently met with so much success in certain towns that the subject ought not to be ignored in considering the point of view of the passenger.

Conclusion.

To dispose briefly of a number of minor details, one might mention that waste ticket-boxes are greatly appreciated by those passengers who are inclined towards tidiness. A railway time-table at each end of the car is often very useful, and large illuminated route numbers are a great boon if the system is large enough to warrant them. Other matters, such as clocks in cars and cleanliness of person and uniform, were dealt with by Mr. Mason in his "Bread-and-Butter Tips" last year, and it is to his excellent paper that I am indebted for the idea which suggested itself (on being asked to contribute a paper for this meeting), that the point of view of the passenger might reasonably be submitted this year instead of dealing with the aspect of tramway administration from within. Someone once said that tramway passengers were composed of all classes of humanity, mostly fools, but I venture to suggest that after nearly twenty years of electric traction the travelling public are entitled to many things which on the average system they do not get, particularly in the nature of a more comfortable ride, less noise, easier exit, and less petty annoyance.

I am quite aware that there are grumblers who deserve no consideration, and who would still grumble about something or other if they had a special car free of charge, but after all they represent a very small proportion of the whole, and can be ignored, as indeed they usually are. Grumbling, like every other evil, can easily become a habit, and if every possible opportunity to "grouse" is removed, the popularity, which is really essential to the success of the undertaking, will be to a large degree assured, and financial benefit to the promoters will undoubtedly result.

In conclusion, I would ask for mercy from certain undertakings whose failings are here disclosed (wild horses would not drag their identity from me), and as the object of a paper should be to promote a live discussion, I trust that these somewhat disjointed views will afford an opportunity for both operating and commercial members to take part.

THE DISCUSSION.

The Chairman.—The meeting is now open for discussion; the paper contains ample material for consideration, and I hope it will be discussed as fully as time allows.

Mr. A. V. Mason (general manager and engineer, South Metropolitan Electric Tramways and Lighting Company).—I have to thank Mr. Robson very much for his paper, and especially for his kind remarks regarding myself and my paper read last year. As regards the technical part of the paper, the thing that interested me most was the question of brakes. I should like to hear something from members on the question of air brakes. If we have got to substitute women motor drivers in place of men—and doubtless many of us will have to do so—this question of air brakes will have to be considered. Even on a route that is fairly hilly there would not be a great deal of difficulty. I am quite certain that with an air brake women could operate the cars, but with the ordinary mechanical hand brake, which, as Mr. Robson says, has had very little modification in the last fifteen or twenty years, they could not. Then as to the question of trucks, I have lately experimented with ball bearings. Although they are rather expensively put in, the trucks ride very much smoother and better. There is rather a curious result to show on the set I have obtained. Whenever we have a fairly empty car the ball bearings save a considerable amount of current.

A Member.—Name?

Mr. Mason.—I will not mention the name; I am not advertising, but when the car gets loaded it seems to run heavily; the current goes up.

The Chairman.—As compared with plain bearings?

Mr. Mason.—Yes. I do not know whether anyone has had the same experience as I have had. I have only one car so fitted. It was interesting to hear Mr. Robson speak of open-air riding. A number of years ago I had exactly the same experience as he has had with trailers. With cross-seated cars, or trailers, passengers must be very much more comfortable than on top deck cars. Naturally the closer to the ground the passenger is carried the less the oscillation. I also note with pleasure Mr. Robson's remarks on shelters. For many years past I have tried to induce several local councils to agree to pavement shelters, but without success. I did get plans for one through, but it was side-tracked on to a side road. I am also very interested in Mr. Robson's remarks *re* windows and bill-sticking. Here in London it is one of the things we have to thank the police for that under no conditions may we put bills lower than six inches below the window rail. It is somewhat strange to find oneself in the position of blessing the police.

Mr. A. W. A. Chivers.—I did not intend to speak, but at your invitation, sir, I will offer one or two observations. The suggestion of doing something more for the passenger is one that I agree with in certain respects, but not in others. While I agree that a clean, well-ventilated and lighted car, with high speeds and easy riding, will attract passengers, and for that reason should be encouraged, I think that, generally speaking, the ordinary tramway passenger has had a great deal more done for him than he has adequately paid for. The average return of profit on capital expenditure on tramways is in many cases extremely low, and I am afraid that if the passenger is studied to a very much larger extent the return will be considerably less. With regard to the question of trucks, I cannot agree altogether with Mr. Robson. I am of opinion that trucks have been considerably improved since the horse-car days. For an example of easy riding that a modern tramway truck will give, I would refer to those cases where cars have to run partly over sleeper construction, which is practically the same as railway construction, and partly over ordinary street railways with concrete foundations. When riding on the cars one can tell immediately the car enters upon sleeper construction. I think many of us here had the privilege of attending the congress at Blackpool some years ago, when we noticed what remarkably good riding there was on the Fleetwood lines, where the track was laid across the fields, compared with the riding through the streets on ordinary street railway construction with concrete foundations. The companies in which I am interested have several lines of sleeper construction, and with the modern trucks the cars ride extremely well, and compare very favourably with the riding on electrified railways and some steam railways. So I think that it is the rigid street tramway construction that is to a large extent responsible for the hard riding we experience on some of our street railways. The question of brakes is one that interests me also, and if there is anyone here who has any particulars of the hand brake that is being used at Huddersfield, I should be glad to have more information about it. Some time ago I assisted in carrying out comparative tests on brake stops between an ordinary single truck tramcar and a modern motor omnibus, and some of us present at the tests were very much struck with the very efficient stops we got with the drum brake used on the omnibus. That led some of us to consider whether a similar form of brake could be used on a tramcar. There was great difficulty in getting the brake drum on the car axle, but it was possible to put it on an extended armature shaft. That idea, however, was not carried out, for the reason that owing to the comparatively high armature shaft speed we thought the speed of the brake friction surface would be so great that the co-efficient of friction at those speeds would be extremely low, and that we should get in practice a bad stop. Therefore if anybody can tell me what the average rate of deceleration is with the form of brake being used at Huddersfield, I shall be extremely obliged. As to car seats, I agree to a certain extent with Mr. Robson,

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but I think there are a good many arguments in favour of longitudinal seats, especially to-day, when cars are overcrowded during rush traffic. I think the question of fare collection is a most important one. It has been debated at our meetings many times, and I am quite sure myself that in a dense and short-distance traffic the collection of fares is much more greatly facilitated with longitudinal seating than with the cross seating. Another point is that the passengers sitting on the outside cross seats have much more difficulty in signalling to the conductor when they wish to alight from the car. The best form of seat depends almost entirely on the conditions under which the car is to be operated. As to the suggestion with regard to seat cushions, I think that there are many places where cushions may well be adopted, and they might in some instances attract more passengers. In some cases my companies have adopted cushions, but I think that in manufacturing towns the ordinary tramcar seat, as almost universally adopted, is quite good enough. On the question of ventilation, I agree that it is a matter for improvement. The ventilation is extremely bad in some cases, especially in some double-deck cars where the inside part of the body is comparatively low. Some years ago I was working on the design of some cars for one of our undertakings—a single-deck type that enabled us to increase the height of the car considerably, and this had a material effect upon the ventilation. The large, roomy body, which is well ventilated by means of end and side ventilators and with torpedo ventilators in the roof, has given, our manager tells me, very great satisfaction. I thank Mr. Robson very much for his paper.

The CHAIRMAN.—Can you tell us, Mr. Hatton, anything about the front exit cars mentioned in the paper?

Mr. E. HATTON (general manager and engineer, Newcastle Corporation Tramways).—I do not know that it is possible to tell you anything more than you have seen in the tramway papers*, except that from the general experience we have had with these front exit cars during two or three months' working, I think you may take it as probable that we shall alter all the cars to that pattern ultimately. I am speaking of single truck cars now, and our experience with these will lead to two or three alterations with double deckers. I think Newcastle was probably the first town in the country to adopt cross seats on the whole of its cars with the exception of about 20; consequently we have had many years' experience with them. But in altering these cars, and allowing a large number of passengers to stand up, the cross seats were an obstruction, so we have had to go back to longitudinal seats. I agree with the last speaker that with longitudinal seats it is very much easier to collect the fares than with cross seats. The cars we have altered are very wide cars, perfectly straight down at the sides, and there is a lot of room, and we have purposely made the seats as narrow as possible. Where the passenger sits down, the floor has been raised up about three inches over the old floor level, so that other passengers can stand in the body of the car without treading on the feet of the seated passengers. There is only room for one person to get on at a time; the passengers have to form up in queues. We have got four altered cars running. Of course, at the present time, our labour difficulties are a bar to effecting these alterations, or we should have completed a larger number of cars. We have not had a single accident on those cars yet, and if that condition of affairs is maintained when we get the whole of the vehicles converted, it will make a very great difference at the end of the year in the claims for compensation. The cars of which I am now speaking are not new cars; if one were building entirely new cars we should have a still more finished article. We should also give the motorman protection; it is quite possible to do that without exceeding too great a length. I am not settled in my own mind yet whether big single-deck cars in towns where there are easy gradients would not be infinitely preferable to double deckers. A lot of people contend that a double-truck car is much more damaging to the permanent way than a single-truck car. That has not been our experience. We have one particular route on which there is possibly the heaviest traffic of the whole system, and owing to the heavy traffic we have almost exclusively to work double-truck cars on it of the four-motor type. As for its life, the track there to-day is in as good a condition as in any other part of the city. So the assertion as to damage to track by double truck cars is not borne out by our experience.

Mr. W. V. EDWARDS (general manager and electrical engineer, Hastings and District Tramways, Limited).—With regard to front exits, I should like to know whether there would be any difficulty in respect of the Board of Trade regulations? I have a strong feeling that in the regulations for the tramways with which I am connected it is settled that all passengers must get out at the rear. I should like to know if that is a usual or a special regulation?

The CHAIRMAN.—The Board of Trade have no objection so long as the exits are on the near side.

Mr. C. W. SHEPHERD (secretary, Edinburgh Tramways Company).—The words in Mr. Robson's paper that struck me most forcibly were "comfort to passengers." From the experience of an old tramway man—I think possibly Mr. Cameron can bear me out—I should say that comfort was the last thing that was thought of in the old days. As a matter of fact, to-day I believe that people are very pleased if they can get on a car at all without any comforts. I believe that the only people who are trying to cater for the comfort of passengers are the London County Council, because they have adopted what to my mind has been wanting for several years, i.e., the trailer car. As you all know, conductors are available but it is very difficult to get the drivers. The difficulty in catering for the travelling public always has been that you have to take back in an hour and a half at night a traffic that takes three hours to bring down in the morning; therefore you cannot expect those passengers to have very much comfort. But I would like to secure the candid opinion of this meeting with regard to the vexed question that Mr. Robson deals with, i.e., the question of employees consuming food on the cars. You are faced to-day with the problem of female conductors, and I am quite sure of this, that if a general method is not adopted to enable the women to get regular meals, etc., their health will be much impaired in a very short time. That will create a bar against the employment of women, and I think we ought to be very careful. Mr. Robson does not say in his paper whether he approves of the man who eats his meal on the car or whether he approves of the man who says he is going to wait ten minutes at the terminus in order to get his food. I should like an expression of opinion as to whether these things should or should not be done. I shall be much obliged to the author if he can give us an explanation as to that.

Mr. F. BLAND.—There are two matters in this paper on which I should like to offer observations. One is the question of the track. The author says that track renewals are difficult, if not impossible. I do not agree with him. Certain things have arisen which the Council of this Association has helped to rectify. A few months ago it was thought to be impossible to get tires or axles, but by arrangement with certain manufacturers that difficulty has been got over. Then difficulties arose about rails. The Council were also able to assist in that matter. Let the members explain to the Council what their trouble is, and then I am sure that they will give them all the assistance they possibly can. Many members seem to have made up their minds that it is impossible to get material of any kind, and consequently they defer matters, putting off the evil day. Although they are making a great deal more money than before; still they think they cannot afford to make renewals. The time will come when they will have to pay more, and it is to their benefit to consider the matter now. The next question I want to deal with is that of books of tickets or tokens. Books of tickets are very handy in a way, although some I have seen are a great nuisance and the conductors complain of them. Tokens might be very much better—some towns have them—but you cannot expect a man to buy half-a-crown or five shillings' worth of tokens and carry them about with him unless he receives some benefit. I think you have got to offer the man some inducement to buy the tokens, say 2d. in the half-crown, otherwise people will not go out of their way to buy them, and I think that is, to a great extent, the opinion of the man in the street.

Mr. E. H. EDWARDES (general manager, Lancashire United Tramways Company).—There is just one point I should like to touch on, viz., the question of trucks. I should like to hear the views of some other members in regard to it. In my opinion the modern tramway truck is the limit.

The CHAIRMAN.—Which way?

Mr. EDWARDES.—There has been very little alteration in them during the last ten years; their design is rotten, as my friend Mr. Mason says. Take the side frame of the tramway truck. Why should it still be made of a solid chunk of steel instead of some steel stampings or girder construction? I never could find that out. Some three or four years ago I determined to get some steel stampings. I think I tried every maker in England; not one maker would make them unless I paid two or three hundred pounds for a die, a thing that a small system like mine could not afford. They said that managers preferred a solid steel frame. But why design them so? Fancy building a bridge of a solid lump of steel. I possess some 40 or 50 trucks, which were made in Germany or Belgium with side frames of steel stampings. These have been in service now for fourteen years. They are ordinary double-deck cars with no tops, and they have never given me the slightest trouble. Recently I put covered tops on, and the side frames now show signs of giving way, owing to the additional weight. The trucks are very light, and if they had been slightly heavier they would have been satisfactory for any load. I believe most managers have trouble with their solid frames—bending one way or the other, or riding solidly. I am of opinion that it would be a very good thing if this association were to appoint a committee of experts to design a truck frame, and then try to persuade some makers in England to manufacture a decent one. As to the last speaker's remarks about the maintenance of track, of course we can get some rails at a certain awful figure, but we cannot afford to pay £17 or £18 a ton for rails. As for cast steel, I recently wanted some steel centres for my wheels; the quotation was £56 10s. a ton. There is a limit in all things, and why the price should be so high I think is very difficult to answer. I thank Mr. Robson for his interesting paper.

The CHAIRMAN.—Mr. Sellon, I think you are interested in the design of cars.

[* *Vide* THE TRAMWAY AND RAILWAY WORLD, of April 13, 1916.]

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Mr. STEPHEN SELLON.—I had no intention of speaking at this meeting, being in an indifferent state of health. But I would like to say that I am not quite in accord with the reader of the paper, inasmuch as all that we want in the tramway business is plenty of money, and we only get plenty of money by doing the best we can for our passengers. Therefore if we can give him a car that will induce traffic, by all means make it more comfortable. We are then raking in shekels we should not otherwise get. Therefore I say that everything that can be done to tempt passengers to ride on your cars should be the object of every general manager. Mr. Chivers made one remark which rather struck me—why give these facilities and these advantages to passengers when the return on capital expenditure is so limited? The answer, of course, is this—what is your capital expenditure? Perhaps it is too high or too large. If the capital expenditure is abnormal, why should the passenger suffer? That is simple; he is at a disadvantage because the undertaking has been badly financed. As regards the longitudinal seat, I venture to suggest that if this meeting were polled, there would be a very large excess of opinion that the longitudinal seat is to the advantage of everybody, both as to accommodation and as to the collection of fares. Mr. Bland made a suggestion that at this stage we should not trouble ourselves about accepting these suggestions, and do the best we can in an economical way by improving faulty joints, etc., because he had a very large supply of rails, or could get them.

Mr. BLAND.—No, no.

Mr. SELLON.—I should like to know where those rails are. I have not got that information, and I should also like to know what price they are; because then, if I found that I had to pay £15 a ton for rails, I think I should be inclined to mend a few joints before I entered upon that sort of enterprise. I do not think there is much more in the paper that I can criticise, because generally I think we must all agree that it suggests a considerable number of little advantages to the management of an undertaking.

Mr. L. E. HARVEY (manager, Ilford Council Tramways).—I did not come prepared to say anything, but with regard to the point raised by Mr. Edwardes—the design of trucks—my experience is very different from his. I know that such trucks as he mentions are a constant source of trouble, chiefly cracking and breaking in all parts. I am sorry my cars are fitted with them. With regard to tokens, I adopted the token system two years ago, allowing 13 penny tokens for a shilling, and 26 halfpenny tokens for a shilling—for I am sorry to say we are afflicted with halfpenny fares. We find those terms work very well. The tokens are put in ordinary paper envelopes, and one can buy them of a conductor or an inspector, and they can also be bought in any quantity at the office. The tokens answer very well; the public approve of them. The only difficulty we have is with the books, owing to the discount.

Mr. J. W. HAME (general manager and electrical engineer, York Corporation Tramways).—Mention has been made of trailer cars. We have trailers in use in York to a limited extent, and so far they have been very satisfactory indeed. I think the outlook is such that the trailer car is likely to be used much more in the future in this country than it has been used in the past. I think the air brake may also come into use a good deal more than it has done. As to the question of the use of a brake drum, I should be interested to know what is the peculiar advantage of using a separate drum instead of using the drum in the form of wheels. It seems to me that there must always be an advantage in using the brake on the wheels, because by so doing those wheels are constantly kept true. If you use a separate drum, and the car moves ever so little and the wheels are locked, innumerable little flats must come on those wheels. There is an interesting point in Mr. Robson's paper with regard to having cars constructed to meet special conditions of low arches and bridges, which unfortunately prevail in some towns. In York there are a number of bars and low arches, but we have been able to maintain the standard height and width of the car without cramping the body.

The CHAIRMAN.—I suppose you have gone some other way.

Mr. HAME.—We have not. We have gone past arches at the sides by a specially constructed track instead of going through the very low arches and bars.

Mr. ERNEST BENEDICT.—I should like to say a word as a passenger. A great deal is being said about safety first. We are all interested in safety first, but I think there are other things that a conductor should be taught. Omnibus conductors used to be called cads, probably because they tried to be very haughty—a different being from anybody else. If he can be taught not to gaze pensively into the interior of the car when the passenger he has seen out of the corner of his eye calls upon him to stop, or to refrain from pulling the string when a passenger is just catching hold of the handrail to get off, there would be an improvement. For when he has pulled the string he will not stop. These are little things we suffer from. Then there is another matter. Why are tickets not collected and sent to the papermakers? I have often asked that, but I have never received an answer that I could understand.

Major F. COUTTS (general manager and electrical engineer, Paisley District Tramways Company).—I would like to offer a remark arising out of Mr. Harvey's observation as to the difficulty of the discount ticket business with the 13 tokens for 1s. It does not seem to be very good business to place the conductor in a position to put in a shilling and take out 13 tickets which the conductor can sell for 13d. That was a very common practice in a town that I once knew, and it had to be stopped. If you number the tickets in the lots sold, selling them in the office only, and require the purchasers to give their names and addresses, they will get their cousins and aunts to purchase and work the thing in a way that really amounts to an increase of salary, the company obtaining no advantage whatever.

The CHAIRMAN.—That was in Scotland. (Laughter.)

Major COUTTS.—I do not know whether Mr. Harvey finds that sort of thing happening in England, but I should like to know whether attention has been paid to the point and whether it really does occur or not. There is another question I should like to ask, namely, whether any manager has had any experience with cars without seats. (Laughter.) I found my rolling stock was quite unable to take the number of munition workers whom we had to carry; a car constructed to carry 57 would be packed with 100 or 120. By taking the seats away altogether I think I could manage to put in 150 persons. I should be glad to know if anyone has had any experience with seatless cars. This would put the extra passengers on the lower deck, which is safer than crowding the upper deck.

Mr. E. HATTON.—In reply to Major Coutts, I may say that it was first proposed at Newcastle that our single-deck cars should be built or altered so as to be entirely without seats, so that passengers should stand up and thus we could carry considerably more munition workers. Owing to lack of labour we could not maintain a sufficient number of cars in service to keep them for this particular use, and as we had to run two or three miles through the centre of the town before we began to carry the munition workers, we did not think that a very large number of people would pay the ordinary fare and stand up. Therefore we had to abandon the idea, and put longitudinal seats in these cars, but we left enough room to stand 40 people in the centre of the car in two rows. We have a very large number of people to carry in these times. I had not had experience of cars entirely without seats, except that in Salford the Trafford Park Company ran special cars without seats for the Westinghouse workpeople. They are really useful cars for quickly dealing with crowds.

The CHAIRMAN.—I must now close the discussion, as time is getting on. I will ask you to pass a hearty vote of thanks to Mr. Robson for having prepared and read this paper. I do not think I need add anything to what has already been said.

The vote of thanks having been accorded with acclamation,

Mr. W. TUKE ROBSON, in reply, said:—I am extremely interested in what Mr. Hatton has just told us about seatless cars. I did think of introducing the subject myself, but as I had taken up the idea of making passengers more comfortable I did not see very well how I could deal with it. But where you have crowds of workmen who must be got away it is an idea worth considering. Mr. Mason raised the question of air brakes as being specially suitable for women drivers. I agree with him. If women drivers do come, as they may, it is extremely likely that we shall have to start making a very much more easily acting brake than we have got at present. Mr. Chivers told us that in his opinion the passengers had had a very good time; but the point I think he missed is that many tramways are now open to great competition; many tramways have omnibuses running in competition with them, and something has got to be done. I am convinced that tramcars must be made more comfortable to ride in if we are to get the patronage we need. Mr. Chivers also asked about the Huddersfield brake to which I referred. I may say that the brake I saw in actual working was perfectly marvellous; you could brake the car up with finger and thumb as easily as you can stop a motor car. I think that also answers the point raised by Mr. Hame. The advantage, of course, is that with this you have a perfectly geared brake, and the slightest touch on the handle is enough to stop the car without skidding. You do not skid because you have the Ferodo lining—the proper brake material instead of metal to metal. Mr. Chivers also stated that in manufacturing towns hard seats were quite good enough. I used to think that, but when all is said and done, what is the majority of your passengers composed of even in manufacturing towns? Not working men at all, but the residents in the town. If you take the electric railways, even in mining districts, you will find them comfortable in actual construction. Their cars have all got rattan seats now, and why should not tramcars have the same? Mr. Chivers also referred to some of his cars having been built with more head room; he suggested that that supplied enough ventilation, but I have not found that to be the case myself. I think we want more ventilation than is simply given through building a car high. Mr. Shepherd told us that comfort was the last thing thought of in the old days, but he does not say whether passengers should be made more comfortable now. I have already explained that it is not only a question of making passengers more comfortable, but of inducing more passengers to ride. He also raised the question of meals on cars. I thought that I said in my paper that if the duty

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sheet does not permit of mealtime reliefs, meals should be confined to something in the nature of a snack at outlying termini or away from the main streets. I do not like to see a man drinking out of a jug on a car. Mr. Edwardes told us that the modern truck is the limit; and I agree with him whole-heartedly. Mr. Bland spoke on the question of track renewals. I know that track renewals are not impossible if you have the rails by you. I have got plenty of rails to do track renewals, and I am going to do them, but if you have not got the rails in stock you cannot afford to pay the £17 a ton which is asked for rails at the present time. For that reason I mentioned the importance of track maintenance. There are methods now which I am sorry were not touched on, methods by which a badly worn or worn-out track and joints can be got into good order by welding. We have recently improved a good deal of our track by thermit welding. The old joint can be stripped, and by packing the rail up, thermit welding, and then grinding smooth, you have a practically perfect joint. I do not know that there are any other points to reply to. I expected to receive very much more slating than I have received, and I am exceedingly obliged to you for the way in which you have received my paper. (Applause.)

The proceedings then closed.

SAFETY WORK OF THE LONDON GENERAL OMNIBUS COMPANY.

ADDRESS BY MR. H. E. BLAIN, OPERATING MANAGER, LONDON UNDERGROUND RAILWAYS AND GENERAL OMNIBUS COMPANY.

The members then paid a visit to the London General Omnibus Company's Training School at Milman's Street, Chelsea, whither they were conveyed by private omnibuses. The visitors were heartily welcomed by Mr. H. E. Blain, the operating manager of the company and the Underground Railways. There was a thorough inspection of the well-fitted, light class-rooms, mess-rooms, clothing stores, etc., and the members had the opportunity of listening to some of the lectures to drivers and conductors. After tea, which was served in the cinematograph hall, special films were shown illustrating London traffic scenes, with reference to the rules of the road for omnibuses, tramcars, and general traffic, methods of training, etc.*

Mr. H. E. BLAIN'S address on "The Safety Movement" was intently listened to. He said:—I have to offer you a hearty welcome to our training school in the name of the company. I have to say that it is a great regret to our managing director, Sir Albert Stanley, that he is unable to be present as he had desired, but he is engaged on War Office work and has asked me to express his regret that he cannot be here to welcome you personally. May I say that to me this feels like old times, for I see many old friends round these tables. I am indeed glad to think that the motor omnibus has not severed our old friendships. Although now engaged with different means of traction, I do not think anything has interfered with the friendship that has existed between us for so long. My friend Mr. de Turckheim—that reference does not seem to meet with the applause it deserves—(laughter and applause)—with that ubiquity which characterises his every action, came to me a month or so back and suggested that he would like to arrange for an inspection of this training school in connection with the annual congress of the Tramways and Light Railways Association, and we were exceedingly pleased to fall in with the suggestion. I hope that you have been interested in the work in the class-rooms, and I also hope that you will be interested in the safety and training films which we propose to display to you shortly. Mr. de Turckheim suggested that a few cursory remarks on the safety movement might be interesting also.

I think that you probably are all aware that the London General Omnibus Company has taken for some time past a considerable part in what is called the "safety campaign." We had intended in 1914 to begin that campaign, but in common with a good many other things it was prevented then by the war. Owing to the danger of the darkened streets and to circumstances connected with the war, it has been necessary during the last few months to pay special attention to this matter, not I am glad to say so far as our own employees are concerned so much as regards the general public. We have been endeavouring for some time past to direct the attention of the public even more than of our own employees to the necessity of exerting themselves and of learning from those little legends which you see all about this training school. When war broke out, at the start, in 48 hours we lost 1,500 of our men to the colours—a number which was increased by the end of the first week to 2,000. We have sent from this company alone over 5,500 men to serve their King and country. Taking our combined industries of underground railways, omnibuses, and tramways, that number is increased to over 9,000, so that you can readily imagine that the question of training assumed a very serious importance to us then, and we were indeed glad to feel that in 1913 this building which you have inspected had been not quite erected but transformed so as to be available for training purposes in connection with our great company. You have been supplied with a little pamphlet containing some information with regard to the school, and I do not propose to say more about it except that we have here the headquarters, first of all, of the engagement of traffic staff, the training and clothing of traffic staff, and the headquarters of the mess-rooms for the traffic staff. We have some 18 mess-rooms in the garages, and we are gradually extending by opening places at terminal points. For instance, in the yard at Victoria Station we have one, and we hope to have others shortly at the terminus at Liverpool Street and the Crystal Palace, two main terminal points. We also have opened certain rooms and mess-rooms for the staff in connection with women conductors. We already have rooms in over 200 houses at terminal points so that they may have proper facilities for washing and general convenience.

I have mentioned the number of our employees who enlisted from our staff of drivers, and it is very well known that a third of our fleet of omnibuses is on the Continent. Our present staff of drivers is 3,500, and 50 per cent. of those are new men since the outbreak of the war. They have gone through the school, and we have a great deal of satisfaction—and I think also some measure of pride—in the fact that with all these people responsible for driving the omnibuses, notwithstanding the huge percentage of new men, our record with regard to accidents has been persistently falling. We have been paying, as I have hinted, very great attention both to the training of the men and to the reduction in the number of accidents in the public streets. The figures with regard to the reduction of accidents are most surprising. So far as I am concerned, I think last Monday I completed my third year with this company, and among other things which certainly gave me cause for very considerable surprise was the enormous amount of compensation which was necessitated by the number of accidents. You all know that the motor omnibus industry in the streets of London is of comparatively recent date. Both the employees themselves and the public had to become accustomed to this new means of locomotion, and you know that in the earlier days—there are even people here with a past (laughter)—there were people who spoke of the motor omnibus as being a Juggernaut that killed large numbers of people in the streets.

It has been our duty to endeavour to reduce the number of fatalities and the number of accidents. I am glad to say during my three years so far as claims and payments are concerned they have been reduced by no less a figure than 50 per cent. I will not give you the total figure, because you want to sleep well to-night. (Laughter.) Since 1910 the total number of accidents has been reduced by 68 per cent., and that figure has been a constantly improving one for every one of those years, being now only 2·15 accidents per 10,000 miles run for the whole fleet. (Applause.) With regard to the safety campaign, you know like many other good things it originated in America—Mr. Mandelick's blushes I believe are quite audible. (Laughter.) There is there a Brady gold medal awarded every year to the traction company that has been most prominent in connection with the safety campaign, and the Boston Elevated Railway, which won it in 1914, state that they had spent £1,500 on the campaign and had reduced their accidents by 25 per cent. I think we have beaten that record without beginning officially the safety campaign, and with the campaign that we are now beginning we feel confident we can rely upon reducing our accidents even more.

We have in this training school, first, the training film, which you will see presently, and which is part of the ordinary curriculum of both drivers and conductors, inspectors, and all other grades who are trained here. I will leave you to judge for yourselves the value of that film, but in passing I may say that we attach the greatest importance to and have found exceedingly useful the cinematograph method in training in connection with transit work. I can with every confidence recommend this to you when systems are large enough to undertake it—I can recommend you to try it even in connection with training for small systems—the method which you will presently see on the screen. As to the question of lifeguards, lifeguards in connection with motor omnibuses have been exceedingly difficult things. I think we have had something like 900 different designs submitted, almost all of which were absolutely impracticable. But after a good deal of discussion and a certain amount of hesitation, the side lifeguard, now made compulsory by the police, was adopted, and we have had 123 cases of lives saved by that side guard. We are trying another sort of front lifeguard on one route, not the one you saw in the yard, but a new one that is being experimented with. The police have not yet approved it, but we hope to get approval of that guard.

I may say in connection with this safety campaign, so far as the general public are concerned, we have been definitely attempting to direct their attention to the matter. We have had a series of advertisements in all the Press right round the London area. We have been giving special prominence to this Safety First—Is it Safe? And you will see on the screen the type of advertisements we have selected. We have also posted on the back staircase of all our fleet three legends, two of which are permanent, but the middle one is changed every Monday morning—one is "Safety First" and the third is "Is it Safe?" Those legends you will also see on the screen. It is unnecessary to say that having advertised in the Press, they have also been good enough to give us a certain amount of assistance in impressing the legends on the public. Then we have, I dare say you may have noticed, during the whole

* A description and illustrations of the Training School were given in THE TRAMWAY AND RAILWAY WORLD of April 13, 1916.

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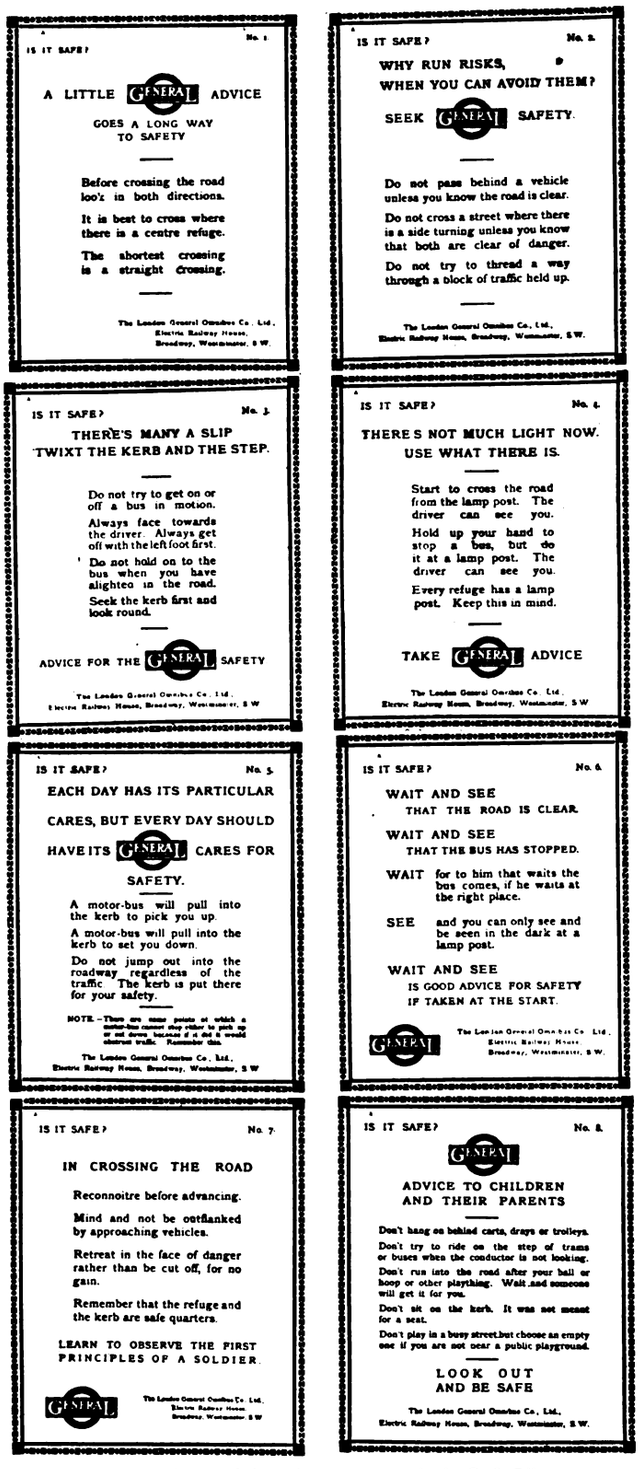
of this winter session a series of efficiency meetings for our operating staff, omnibuses, tramways, and railways, at which we sometimes have had the pleasure of having present managers and officials of the tramways connected with the combine. We have had safety papers there, with some exceedingly interesting comparisons between the results obtained on railways and on omnibuses and on tramways, and I think the effect of those comparisons has been stimulative to the superintendents in charge of the respective branches of our industry.


IS IT SAFE? No. 1.
A LITTLE GENERAL ADVICE
GOES A LONG WAY TO SAFETY
Before crossing the road look in both directions.
It is best to cross where there is a centre refuge.
The shortest crossing is a straight crossing.
IS IT SAFE? No. 2.
WHY RUN RISKS, WHEN YOU CAN AVOID THEM?
SEEK GENERAL SAFETY.
Do not pass behind a vehicle unless you know the road is clear.
Do not cross a street where there is a side turning unless you know that both are clear of danger.
Do not try to thread a way through a block of traffic held up.
IS IT SAFE? No. 3.
THERE'S MANY A SLIP TWIXT THE KERB AND THE STEP.
Do not try to get on or off a bus in motion.
Always face towards the driver. Always get off with the left foot first.
Do not hold on to the bus when you have alighted in the road.
Seek the kerb first and look round.
ADVICE FOR THE GENERAL SAFETY
IS IT SAFE? No. 4.
THERE'S NOT MUCH LIGHT NOW. USE WHAT THERE IS.
Start to cross the road from the lamp post. The driver can see you.
Hold up your hand to stop a bus, but do it at a lamp post. The driver can see you.
Every refuge has a lamp post. Keep this in mind.
TAKE GENERAL ADVICE
IS IT SAFE? No. 5.
EACH DAY HAS ITS PARTICULAR CARES, BUT EVERY DAY SHOULD HAVE ITS GENERAL CARES FOR SAFETY.
A motor-bus will pull into the kerb to pick you up.
A motor-bus will pull into the kerb to set you down.
Do not jump out into the roadway regardless of the traffic. The kerb is put there for your safety.
IS IT SAFE? No. 6.
WAIT AND SEE THAT THE ROAD IS CLEAR.
WAIT AND SEE THAT THE BUS HAS STOPPED.
WAIT for to him that waits the bus comes, if he waits at the right place.
SEE and you can only see and be seen in the dark at a lamp post.
WAIT AND SEE IS GOOD ADVICE FOR SAFETY IF TAKEN AT THE START.
IS IT SAFE? No. 7.
IN CROSSING THE ROAD
Reconnoitre before advancing.
Mind and not be outflanked by approaching vehicles.
Retreat in the face of danger rather than be cut off, for no gain.
Remember that the refuge and the kerb are safe quarters.
LEARN TO OBSERVE THE FIRST PRINCIPLES OF A SOLDIER.
IS IT SAFE? No. 8.
GENERAL
ADVICE TO CHILDREN AND THEIR PARENTS
Don't hang on behind carts, drays or trolleys.
Don't try to ride on the step of trams or buses when the conductor is not looking.
Don't run into the road after your ball or hoop or other plaything. Wait and someone will get it for you.
Don't sit on the kerb. It was not meant for a seat.
Don't play in a busy street but choose an empty one if you are not near a public playground.
LOOK OUT AND BE SAFE

Specimen Advertisements—"Is it Safe?"

We have issued, or are beginning to issue, a series of safety pamphlets, of one of which I think you have all had a copy. One is addressed particularly to children, and through the London County Council schools we have this week distributed over a quarter of a million of those pamphlets. We have put a little picture on the back, and think that probably the children will take them home and be sufficiently interested to read the contents. We are following this up with others—I think the next is going to be a pathetic ballad of ten little nigger boys, with silhouetted drawings. With regard to miscellaneous publicity—I am afraid the corridors are too light to allow you to see them—but we have shades on all our lamps in the corridors, with little safety instructions, such as "Mind your step," and those shades are being put on all lamps at railway stations on our underground railways.

We are now busy with a new film, parts of which have been constructed in this way; we have analysed all types of accidents that we have had on the omnibus routes for the last two years; we have selected all those that are frequently recurring; we have reconstructed—it seems rather Irish—those accidents which we have had with either tramcars or omnibuses, and we have placed them in such a position that we get a graphic representation of those particular accidents. Those are being reproduced in the way you see at the back of the mess-room menu card. We are going to issue a little brochure, with illustrations of the types of accidents and how they ought to have been avoided if the instructions to the men had been carried out. With regard to our new film, we shall be glad to lend portions of it to cinematograph proprietors in the area, free of charge, and as they are always glad to have anything free, we do not think we shall have much difficulty in getting them placed. I have now alluded briefly, in accordance with Mr. de Turckheim's suggestion, to how we entered on this campaign with regard to the Safety Movement. He also suggested that you might be interested in another matter, which does not come within the scope of the safety movement, viz., women conductors.

Women Conductors and Mess Rooms.

We have up to to-day interviewed over 13,000 women applicants since we took into consideration their engagement last March. We have now passed through this school 1,000, and taking to-day's figures a third of our fleet of motor omnibuses is manned by women at the back. (Laughter.) We have 14 women instructors; we had to begin with the instruction being given by male instructors attached to the school. Now we have trained sufficient of our new applicants so that they can take over the work—you saw one class actually in progress by one of our lady lecturers to a class of girls. We have 19 female timekeepers; that has only just been beginning the last week or two, but as we are losing men at a very rapid rate we have to consider the employment of women on the inspecting staff as well as in the other directions, and we have 12 female cashiers attached to the depots. Now it has been suggested—I heard somebody speaking about it during the discussion this afternoon—that these girls will be unable to stand the strain. Well, out of those 1,000 girls we have only lost up to the present 37; that is about 4 per cent., and only some 20 of those have given up the work because it is too hard. It is interesting to know that practically all those gave up within three or four days. Our experience is that this work is not too arduous for women; on the contrary, our difficulty is to keep them supplied with uniforms, because we find that after about a month of open air, exercise, and our excellent 6½d. dinners, uniforms at first a bit slack get tight, and they have to be taken away and a bigger uniform supplied. We have had quite a number of cases where in three months we have had to rig a girl out no less than three times.

With regard to the mess-rooms, I am not quite sure whether I said that we had 18 of them, but it may interest you to know something about the figures. We have put on the table a number of specimen menu cards from our different mess-rooms—you can take them away if you like and are interested; you see we give a very good dinner, meat and two vegetables and a sweet, for 6½d. We have not found it necessary to increase the cost of anything since the war except tea. We used to give tea for ½d.; that is the only item we have had to put up to a penny. Our annual turnover in these rooms amounts to 2½ million transactions, which are not very heavy, averaging a little over 3d. each. The income this year will be £30,000. (Applause.) The company provide the accommodation, lighting, and equipment, but the mess-rooms at those prices pay the cost of the food and the necessary staff. We do not want to make a profit out of it. My chief trouble when I criticised the accounts for the last two or three months has been to find that it has been getting on the wrong side, i.e., a little profit is being made. We do not want to see that, so we shall probably have to increase the quantities supplied as we cannot well decrease the prices. Any of you who are interested in mess transactions may like to know that 36½ per cent. is raised on meat, 8 from cakes and biscuits, 7 bacon, 6 eggs, 5½ from tinned goods, 5½ tea, etc., 4½ butter, 4 bread, 4 sugar, 2½ flour and rice, and 2 per cent. from potatoes. These are dry statistics, but I thought they might interest you, as the matter has not been gone into very extensively by anybody outside this company and our staff. Our genuine opinion is that it is a very fine thing for the company and the staff. There is no question about it. If you can provide, as we are doing successfully, excellent food for your employees, they are better in physique, it is better for them than wandering about at terminal points into public houses, and we are more than repaid by the genuine good which is the result of this particular department. (Applause.) It has been a great delight to meet you here. Some day I feel that the whole of the traction people will be interested together in one association. The day has gone by for tramways,

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omnibuses, and everything else to remain apart; we are all traffic people, and there is no more reason why traffic people cannot come together than certain other people do not come together. In conclusion, may I again say it has been a great pleasure to us to welcome you, and if you have seen anything to interest you we are delighted. (Applause.)

Mr. R. J. HOWLEY (joint manager, British Electric Traction Company).—I desire to propose a vote of thanks to Mr. Blain and the company for the very pleasant and instructive afternoon we have had. Of all the visits in the past which we have had in connection with our conferences, I think this has been one of the best. Not the least interesting part has been Mr. Blain's address. He has taken us right through the subject of Safety First, and I do not think anyone can go away feeling that everything has not been shown and that there has not been full information. To us, as people engaged in the tramway traction, what will come to our minds at once is that here we have seen the best example. It is an example which I am sorry to say that owing to our size many of us cannot follow. But it is the best example of keeping this industry up to date and making for the efficiency of the transit business. I welcome Mr. Blain's suggestion that there should be a closer interchange of ideas among all those engaged in passenger transit work; the whole efficiency of the industry depends on keeping with the times and going ahead. One of the most important things, especially in these days of increased speed, is public safety. We have seen to-day how magnificently the matter has been taken up by this important company and how thoroughly they have gone into it, right from the smallest detail up to the biggest point. We are all pleased particularly to have been here to-day under Mr. Blain's ægis; I think we all still regard him as a tramway man. For many years we have listened to him at the meetings of the various associations—listened to the instructive way in which he has always brought these matters before us. I think perhaps that in years to come the omnibus business will be connected with nearly all the tramway businesses represented here to-day. Mr. Blain is a difficult man to follow, for I think you will all agree with me that he has a command of language such as none of us have. I will therefore conclude by tendering our thanks to him, to Sir Albert Stanley, and to the officers and directors of the company for the very instructive and very pleasant afternoon they have afforded us.

Mr. J. CAMERON (general manager and secretary, Blackpool and Fleetwood Tramroad Company) formally seconded the motion, endorsing Mr. Howley's remarks as to the profitable nature of the visit, which to him as a provincial man was of peculiar interest.

Mr. HARRY ENGLAND (general manager and secretary, Yorkshire (West Riding) Electric Tramways).—It is my duty and privilege, in the absence of our chairman, to put the vote of thanks. But before doing so I should like to say a few words on my own behalf. I have known Mr. Blain for many years, long before he joined this competitive business. I join issue with him on that aspect of the question. It is not the competitive business in the sense in which it was regarded a few years ago. We are here as transport experts, whether of motor omnibus or tramcars is quite immaterial at present. What I want to do is to express my appreciation of Mr. Blain's efforts this afternoon and in the past. Those of us who had the privilege of attending the West Ham conference a few years ago know the way in which Mr. Blain organised the meetings and the way we were treated. In a similar way Mr. Blain has been equally as good to-day, and his efforts on behalf of the association are warmly appreciated. Whatever he does he does well and thoroughly, and we can all endorse what has been already said. I put this vote of thanks with the greatest possible pleasure.

The motion was carried with the heartiest acclamation.

Mr. BLAIN.—Mr. Howley and friends, for the personal side of the vote of thanks I thank you very sincerely. On the official side, I will ask our popular secretary, Mr. Mandelick, to say a few words.

Mr. W. E. MANDELICK (secretary of the Underground and Omnibus Companies) said:—I will not detain you very long with the few remarks I have to make. Of course, speaking as an underground man—I came to this country 16 years ago to help build the tube railways—we did take a very big chance in asking Mr. Blain to join our forces, because he really was a tramway man, and we did not think he would go underground or care to operate the omnibuses for us. But knowing the man and his reputation we took the chance, and you can see how well he has fallen into the new position. We are very much obliged to you all for coming here this afternoon, and I hope what little you have seen will prove interesting to you. Mr. Blain is really responsible for the progress we have been making in our Safety First campaign; he is very keen on the subject. Mr. Blain has had a great deal to do with the selection and training of the women conductors; he says they like their work, and has got us to put seats on the omnibuses for them, because it is better they should sit on the platform than on country routes sit inside the omnibuses. They are shelf seats and will make the ladies even happier and more contented than they were before. I am very much obliged to you for the vote of thanks.

The cinematograph exhibition and lecture by Instructor Savidge, which followed, were very much appreciated,

THE ANNUAL DINNER.

This event, which was an informal gathering of members and friends, took place at the Trocadero Restaurant, whither the company were conveyed in omnibuses on the conclusion of the proceedings at the Training School. The Right Hon. Viscount Chilston, the president, occupied the chair, and those present included the following:—

G. S. Albanese.
R. H. Aspinwall.
S. E. Baker.
Alex. Balfour.
Geo. Balfour.
A. H. Beatty.
W. W. Beaumont.
H. R. Beken.
Lieut. L. Bellamy.
E. Benedict.
C. Bickersteth.
H. E. Blain.
F. Bland.
F. Bourne.
P. B. Brown.
Ald. H. Brown.
J. Browning.
C. L. Buckley.
R. C. Bullough.
C. Burnet.
S. H. Callow.
J. Cameron.
J. M. Cater.
R. Chisnall.
Viscount Chilston.
R. W. T. Corbet.
H. P. Conibear.
H. B. Corrie.
Major F. Coutts.
A. Coveney.
Harris F. Crookes.
J. Deschacht.
A. de Turckheim.
J. Devonshire.
—. Dias.
Ald. F. A. Dunsford.
E. H. Edwardes.
W. Vincent Edwards.
H. England.
J. Fry.
T. E. Gatehouse.
T. B. Goodyer.
J. W. Hame.
W. H. Hawley.
E. J. Hazel.
L. E. Harvey.
E. Hatton.
F. Hewer.
W. T. Hill.
A. J. Hollington.
G. T. Hollington.
W. Shaw Hopking.
J. Housman.
R. J. Howley.
S. Hornsby.
J. S. Huddleston.
Fearnside Irvine.
N. Jacobs.
A. Johnson.
C. J. Jewell.
J. J. Kelley.
B. Kingsford.
C. J. Knight.
D. Y. Knight.
—. Kossovoi.
St. A. Ledger.
E. H. Lean.
A. G. Longdon.
W. L. Lorkin.
H. Lotery.
A. E. Manley.
W. L. Madgen.
P. V. MacMahon.
C. W. Mallins.
H. Martin.
A. V. Mason.
H. F. Maynard.
Coun. R. Mayne.
J. C. Mitchell.
C. Mittelhausen.
J. F. Moss.
E. A. Nash.
A. Norton.
W. B. Pickering.
Fletcher J. Purser.
E. S. Quilliam.
W. Tuke Robson.
C. W. Rooke.
Capt. A. Rozier.
E. Sangier.
S. F. Shears.
C. W. Shepherd.
S. Sellon.
G. J. Shave.
E. E. Sharp.
W. Shearer.
R. T. Simcock.
W. Alderson Smith.
P. H. Frost Smith.
H. K. Spark.
Hon. A. Stanley, M.P.
C. D. Stanley.
M. O. Spicknall.
Ald. E. Russell Taylor.
W. Thom.
J. P. Thomas.
A. Toms.
H. E. Townell.
J. H. Turner.
W. R. Turnell.
H. Tomlinson-Lee.
W. C. Ullmann.
—. Verdickt.
S. Watford.
H. L. White.
A. M. Willcox.
H. L. Williams.
W. Wyld.
H. T. Wigham.
H. R. White.

The toast of "His Majesty the King" was loyally honoured. The Chairman subsequently referred with satisfaction to the manner in which the Association had maintained its usefulness during a very trying year, and also observed that the industry was indebted to the women of the country for the manner in which they had come forward and filled the places of the many thousands of men who had gone to uphold the honour of the Empire on the battlefield. His Lordship also expressed, amid applause, the pride entertained by the members in the indefatigable work of the Hon. Arthur Stanley, C.B., as the head of the Red Cross organisation, which had accomplished so grand a work for the wounded and sick of the Allied Forces.

In acknowledging the remarks of the chairman and the hearty greeting of the company, the Hon. A. Stanley thanked the managers of the numerous tramway undertakings that had made collections on the cars for the funds of the Red Cross Society. He expressed regret that Alderman Russell Taylor, chairman of the Liverpool Tramways Committee, had been unable to be present, and proposed his election as a vice-president of the Association, which was agreed to unanimously. Mr. Stanley also alluded to the valuable and successful work of the secretary, Mr. de Turckheim, during the year in promoting the interests of the Association and the industry. Mr. de Turckheim briefly responded.

METROPOLITAN ASSOCIATION OF ELECTRIC TRAMWAY MANAGERS.

VISIT TO SOUTHAMPTON.

Members of the Metropolitan Association of Electric Tramway Managers on July 5 paid a visit to Southampton for the purpose of inspecting the tramways, and particularly the car depot and workshops. The hospitality with which the party was received, and the entertaining programme arranged by Mr. T. B. Goodyer, hon. secretary of the association, and Mr. W. T. Robson, general manager of Southampton Corporation Tramways, made the occasion thoroughly enjoyable, while enabling the visitors to acquire much information with reference to the tramways installation under very agreeable conditions. On arrival the party was met by Mr. Robson and conveyed in special cars to the pleasant and roomy offices of the tramway department. Here Alderman F. A. Dunsford, the chairman of the tramways committee, welcomed the visitors, who were subsequently entertained to luncheon at the South-Western Hotel by the Mayor, Alderman W. J. Dacombe, who presided. In expressing his pleasure at receiving the association, the Mayor paid a cordial compliment to Mr. Robson, who, he said, had been with them for a year and had made his presence felt in a way which was highly beneficial to the tramway undertaking and the public. The Council had recently accepted his advice in regard to a re-arrangement of fares which he (the Mayor) believed would have great advantages, and he had no doubt that other recommendations of the manager would be willingly accepted by the committee. Mr. W. C. Ullmann,

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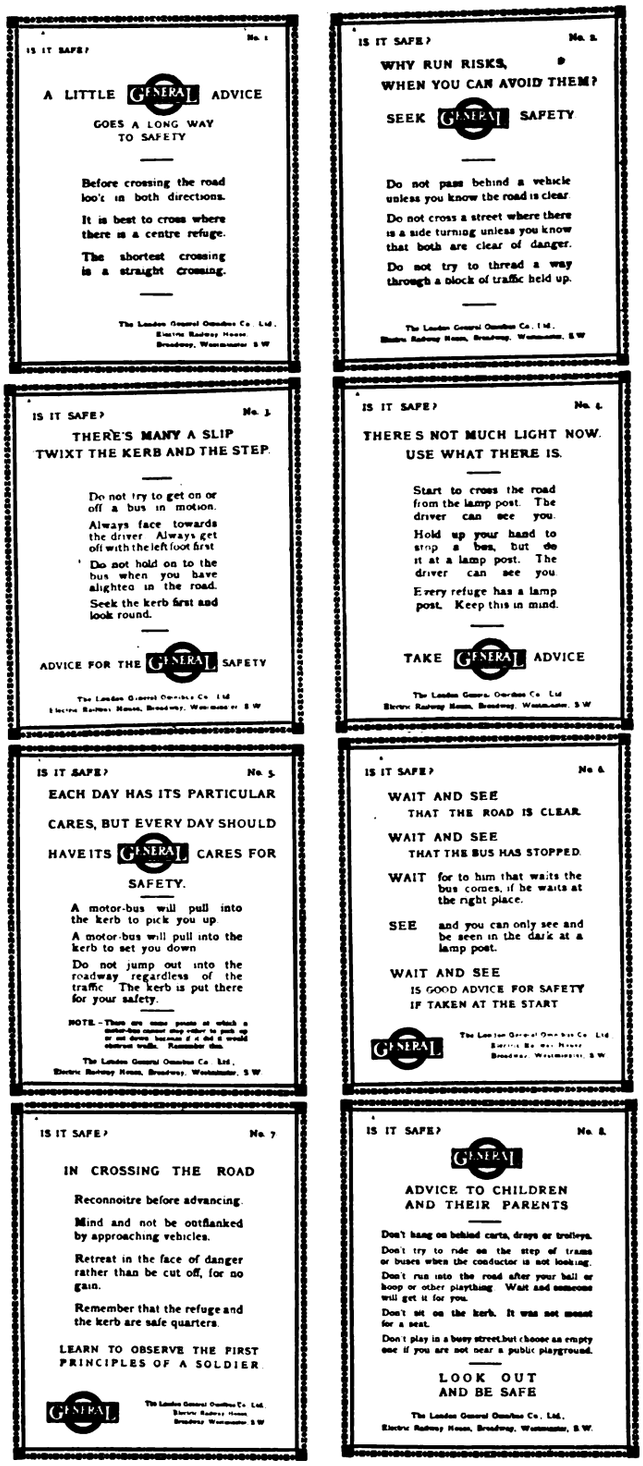
of this winter session a series of efficiency meetings for our operating staff, omnibuses, tramways, and railways, at which we sometimes have had the pleasure of having present managers and officials of the tramways connected with the combine. We have had safety papers there, with some exceedingly interesting comparisons between the results obtained on railways and on omnibuses and on tramways, and I think the effect of those comparisons has been stimulative to the superintendents in charge of the respective branches of our industry.


IS IT SAFE? No. 1
A LITTLE GENERAL ADVICE
GOES A LONG WAY TO SAFETY
Before crossing the road look in both directions.
It is best to cross where there is a centre refuge.
The shortest crossing is a straight crossing.
IS IT SAFE? No. 2.
WHY RUN RISKS, WHEN YOU CAN AVOID THEM?
SEEK GENERAL SAFETY
Do not pass behind a vehicle unless you know the road is clear.
Do not cross a street where there is a side turning unless you know that both are clear of danger.
Do not try to thread a way through a block of traffic held up.
IS IT SAFE? No. 3.
THERE'S MANY A SLIP TWIXT THE KERB AND THE STEP.
Do not try to get on or off a bus in motion.
Always face towards the driver. Always get off with the left foot first.
Do not hold on to the bus when you have alighted in the road.
Seek the kerb first and look round.
ADVICE FOR THE GENERAL SAFETY
IS IT SAFE? No. 4.
THERE'S NOT MUCH LIGHT NOW. USE WHAT THERE IS.
Start to cross the road from the lamp post. The driver can see you.
Hold up your hand to stop a bus, but do it at a lamp post. The driver can see you.
Every refuge has a lamp post. Keep this in mind.
TAKE GENERAL ADVICE
IS IT SAFE? No. 5.
EACH DAY HAS ITS PARTICULAR CARES, BUT EVERY DAY SHOULD HAVE ITS GENERAL CARES FOR SAFETY.
A motor-bus will pull into the kerb to pick you up.
A motor-bus will pull into the kerb to set you down.
Do not jump out into the roadway regardless of the traffic. The kerb is put there for your safety.
IS IT SAFE? No. 6.
WAIT AND SEE THAT THE ROAD IS CLEAR.
WAIT AND SEE THAT THE BUS HAS STOPPED.
WAIT for to him that waits the bus comes, if he waits at the right place.
SEE and you can only see and be seen in the dark at a lamp post.
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LOOK OUT AND BE SAFE
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The motion was carried with the heartiest acclamation.

Mr. BLAIN.—Mr. Howley and friends, for the personal side of the vote of thanks I thank you very sincerely. On the official side, I will ask our popular secretary, Mr. Mandelick, to say a few words.

Mr. W. E. MANDELICK (secretary of the Underground and Omnibus Companies) said:—I will not detain you very long with the few remarks I have to make. Of course, speaking as an underground man—I came to this country 16 years ago to help build the tube railways—we did take a very big chance in asking Mr. Blain to join our forces, because he really was a tramway man, and we did not think he would go underground or care to operate the omnibuses for us. But knowing the man and his reputation we took the chance, and you can see how well he has fallen into the new position. We are very much obliged to you all for coming here this afternoon, and I hope what little you have seen will prove interesting to you. Mr. Blain is really responsible for the progress we have been making in our Safety First campaign; he is very keen on the subject. Mr. Blain has had a great deal to do with the selection and training of the women conductors; he says they like their work, and has got us to put seats on the omnibuses for them, because it is better they should sit on the platform than on country routes sit inside the omnibuses. They are shelf seats and will make the ladies even happier and more contented than they were before. I am very much obliged to you for the vote of thanks.

The cinematograph exhibition and lecture by Instructor Savidge, which followed, were very much appreciated,

THE ANNUAL DINNER.

This event, which was an informal gathering of members and friends, took place at the Trocadero Restaurant, whither the company were conveyed in omnibuses on the conclusion of the proceedings at the Training School. The Right Hon. Viscount Chilston, the president, occupied the chair, and those present included the following:—

G. S. Albanese.
R. H. Aspinwall.
S. E. Baker.
Alex. Balfour.
Geo. Balfour.
A. H. Beatty.
W. W. Beaumont.
H. R. Beken.
Lieut. L. Bellamy.
E. Benedict.
C. Bickersteth.
H. E. Blain.
F. Bland.
F. Bourne.
P. B. Brown.
Ald. H. Brown.
J. Browning.
C. L. Buckley.
R. C. Bullough.
C. Burnet.
S. H. Callow.
J. Cameron.
J. M. Cater.
R. Chisnall.
Viscount Chilston.
R. W. T. Corbet.
H. P. Conibear.
H. B. Corrie.
Major F. Coutts.
A. Coveney.
Harris F. Crookes.
J. Deschacht.
A. de Turckheim.
J. Devonshire.
—. Dias.
Ald. F. A. Dunsford.
E. H. Edwardes.
W. Vincent Edwards.
H. England.
J. Fry.
T. E. Gatehouse.
T. B. Goodyer.
J. W. Hame.
W. H. Hawley.
E. J. Hazel.
L. E. Harvey.
E. Hatton.
F. Hewer.
W. T. Hill.
A. J. Hollington.
G. T. Hollington.
W. Shaw Hopking.
J. Housman.
R. J. Howley.
S. Hornsby.
J. S. Huddleston.
Fearnside Irvine.
N. Jacobs.
A. Johnson.
C. J. Jewell.
J. J. Kelley.
B. Kingsford.
C. J. Knight.
D. Y. Knight.
—. Kossovoi.
St. A. Ledger.
E. H. Lean.
A. G. Longdon.
W. L. Lorkin.
H. Lotery.
A. E. Manley.
W. L. Madgen.
P. V. MacMahon.
C. W. Mallins.
H. Martin.
A. V. Mason.
H. F. Maynard.
Coun. R. Mayne.
J. C. Mitchell.
C. Mittelhausen.
J. F. Moss.
E. A. Nash.
A. Norton.
W. B. Pickering.
Fletcher J. Purser.
E. S. Quilliam.
W. Tuke Robson.
C. W. Rooke.
Capt. A. Rozier.
E. Sangier.
S. F. Shears.
C. W. Shepherd.
S. Sellon.
G. J. Shave.
E. E. Sharp.
W. Shearer.
R. T. Simcock.
W. Alderson Smith.
P. H. Frost Smith.
H. K. Spark.
Hon. A. Stanley, M.P.
C. D. Stanley.
M. O. Spicknall.
Ald. E. Russell Taylor.
W. Thom.
J. P. Thomas.
A. Toms.
H. E. Townell.
J. H. Turner.
W. R. Turnell.
H. Tomlinson-Lee.
W. C. Ullmann.
—. Verdickt.
S. Watford.
H. L. White.
A. M. Willcox.
H. L. Williams.
W. Wyld.
H. T. Wigham.
H. R. White.

The toast of "His Majesty the King" was loyally honoured. The Chairman subsequently referred with satisfaction to the manner in which the Association had maintained its usefulness during a very trying year, and also observed that the industry was indebted to the women of the country for the manner in which they had come forward and filled the places of the many thousands of men who had gone to uphold the honour of the Empire on the battlefield. His Lordship also expressed, amid applause, the pride entertained by the members in the indefatigable work of the Hon. Arthur Stanley, C.B., as the head of the Red Cross organisation, which had accomplished so grand a work for the wounded and sick of the Allied Forces.

In acknowledging the remarks of the chairman and the hearty greeting of the company, the Hon. A. Stanley thanked the managers of the numerous tramway undertakings that had made collections on the cars for the funds of the Red Cross Society. He expressed regret that Alderman Russell Taylor, chairman of the Liverpool Tramways Committee, had been unable to be present, and proposed his election as a vice-president of the Association, which was agreed to unanimously. Mr. Stanley also alluded to the valuable and successful work of the secretary, Mr. de Turckheim, during the year in promoting the interests of the Association and the industry. Mr. de Turckheim briefly responded.

METROPOLITAN ASSOCIATION OF ELECTRIC TRAMWAY MANAGERS.

VISIT TO SOUTHAMPTON.

Members of the Metropolitan Association of Electric Tramway Managers on July 5 paid a visit to Southampton for the purpose of inspecting the tramways, and particularly the car depot and workshops. The hospitality with which the party was received, and the entertaining programme arranged by Mr. T. B. Goodyer, hon. secretary of the association, and Mr. W. T. Robson, general manager of Southampton Corporation Tramways, made the occasion thoroughly enjoyable, while enabling the visitors to acquire much information with reference to the tramways installation under very agreeable conditions. On arrival the party was met by Mr. Robson and conveyed in special cars to the pleasant and roomy offices of the tramway department. Here Alderman F. A. Dunsford, the chairman of the tramways committee, welcomed the visitors, who were subsequently entertained to luncheon at the South-Western Hotel by the Mayor, Alderman W. J. Dacombe, who presided. In expressing his pleasure at receiving the association, the Mayor paid a cordial compliment to Mr. Robson, who, he said, had been with them for a year and had made his presence felt in a way which was highly beneficial to the tramway undertaking and the public. The Council had recently accepted his advice in regard to a re-arrangement of fares which he (the Mayor) believed would have great advantages, and he had no doubt that other recommendations of the manager would be willingly accepted by the committee. Mr. W. C. Ullmann,

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general manager and engineer of East Ham Corporation Tramways, expressed the thanks of the guests to the Mayor and Alderman Dunsford for their welcome and hospitality, and remarked that they were all impressed with the beauty of the town and the handsome appearance of the tramway cars.

After luncheon special cars conveyed the party to the pier, and in brilliant weather a trip was made across the Solent to Portsmouth, in the course of which the visitors were entertained to tea by Ald. Dunsford. On returning, a tour was made over a portion of the tramways and an hour was spent at the Portsdown car depot and workshops, the excellent equipment of which was perhaps a surprise to those who had not kept in touch with the progress of the undertaking. Of special interest were the Edison electric tower wagon and an electric permanent way tip wagon that has replaced five horses. A charging and welding plant installed in a car was also examined with interest. The method of repairing defective joints by cutting out the rail ends and welding in new pieces was carefully inspected.

Later the party visited the Pirelli General Cable Works, where they were received by Mr. H. Bevis, the managing director. The visit, though necessarily a brief one, as the party was to return to Waterloo by the eight o'clock train, proved of the greatest interest. The works are new, and the visitors were sensibly impressed by the character of the equipment. The making of cables involves much complicated apparatus, and the designers of the works have spared no effort to secure the latest equipment with a view to obtaining the highest efficiency in the manufacture of cables of all sizes. The works are, in fact, excellently planned and admirably equipped in every respect; and—a feature of encouragement to those who are concerned about British enterprise after the war—ample space has been provided for extensions. It was pleasant to learn also that the Corporation of Southampton have assisted the company in every possible way in the initiation of their enterprise. At the conclusion of the visit the Mayor, in proposing a vote of thanks to Mr. Bevis, spoke of the erection of the works as a great achievement, and expressed the pride which the Corporation felt in the selection of Southampton for the location of the new works. Mr. Bevis, in reply, alluded to the help they had received from the Corporation. They had set out to obtain clean works in clean and healthful surroundings.

TIME TABLES AND DUTY SHEETS.

At the May Efficiency Meeting of the Operating Department of the London Underground Railways and General Omnibus Company group, held at the L.G.O.C. Training School, Milman Street, Chelsea, S.W., a paper on "Time Tables and Duty Sheets: Comments and Criticisms on Methods and Practice" was read by Mr. Evan Evans, of the department of the railway superintendent of the line. The chair was occupied by Mr. H. E. Blain, the operating manager, and there was again a good attendance of officials.

Mr. Evans traced the changes in the working of the underground railways connected with the group, numerous slides being exhibited on the screen, the first showing the constant improvement effected in the frequency of the service on the busiest section—that between South Kensington and Mansion House—during the busiest hour of the day. This had grown from twelve trains per hour in 1871 to forty-three in 1916. The influence on railway time tables of physical limitations both imposed by the line itself and the number of its stations and junctions, as well as by the influence of the connections with other railways, was pointed out. Two standards were necessary in drafting a time table in skeleton form, one being for an hour of the peak load and one for an hour of the slack service, and it was usual to stimulate traffic by providing a service ahead of the immediate needs with a view to development. On a time table being put into operation, two points were kept under observation, viz., to see (a) how it fitted the needs of the traffic, and (b) how it worked. Attention to these matters had reduced the time occupied by trains over the tunnel section of the District Railway in the ratio of 49 to 27. Popularity and prosperity of routes were largely due to adequacy and punctuality of service, whilst unpunctuality also carried in its wake disorganisation and uneconomical working.

The railway lay-over facilities and coupling arrangements were described, and specimens of time tables discussed. It was pointed out that the principle of non-stopping at specified stations had three distinct advantages:—

(*a*) The assistance it gave in regulating the loading of the trains.
(*b*) Reduction in time occupied on the journey.
(*c*) Operating economy, enabling the rolling stock to run a greater mileage and reducing the current consumption,

two out of the three of these being to the advantage of the passenger. There were different systems of non-stopping; that adopted on the Piccadilly line being called in America the "skip-stop," trains passing alternate stations which were but a short distance apart. On the District Railway the junctions were utilised to act as relief lines, a clear run for each train being obtained by arranging for the previous train to be cleared at a junction, or itself to become a non-stop at a certain point. Methods of taking train loadings were described, together with the system of coupling and uncoupling additional carriages according to the traffic demands of different hours of the day.

In considering omnibus time tables, it was found that, just as the introduction of electric working on the railways had permitted a decrease of from 25 to 30 per cent. in the running times, so the displacement of the horse omnibus by the motor had achieved an equivalent improvement, and allowed of much longer journeys being undertaken, the increased facilities of through travelling being much appreciated by the public. The methods of omnibus time table preparation were described, and the particular problems involved discussed, slides being exhibited of leading charts and other interesting data.

The final portion of the paper dealt with the preparation of men's duty sheets, and the various systems in operation on both the railways and omnibuses were described and analysed, it being pointed out that this portion of the work was an exceedingly important one, requiring the exercise of considerable knowledge and skill.

The discussion was opened by Mr. E. R. Peaty, superintendent of the Time Schedules Department of the L.G.O.C., and he was followed by a number of the officials, some keen criticism resulting.

The next paper of the series will deal with ticket systems.

BRITISH ELECTRIC TRACTION COMPANY.

QUESTIONS FOR PARLIAMENTARY CONSIDERATION.

The twentieth annual meeting was held on June 23, Mr. E. Garcke presiding. In moving the adoption of the report (a summary of which appeared in our issue of June 10), the chairman stated that of 11,000 of their employees in Great Britain over 3,300 joined the forces before compulsory service was adopted, and 120 of them had made the highest sacrifice man could offer for his country. To some extent the vacancies had been filled by women, of whom nearly 2,000 were employed, and were giving complete satisfaction. Higher wages and prices for materials had had to be paid because of the war, and altogether the working expenses had increased considerably, but the company were not able to increase the fares and the rates charged for electricity. These were fixed by Acts of Parliament, and in most cases could not be increased. If, therefore, they showed larger profits, it was because they had done much more work, for they had earned less per passenger and per unit. They were making no so-called war profits. An Act had been passed taxing heavily all profits made during the war in excess of those of a pre-war period. Tramway and electricity supply companies, if they were profitable, were taken over by local authorities on the expiration of specified periods, and the price paid was generally less than the capital expended. Therefore those companies were bound to make large reserves out of profits, and it was only after the undertakings had been developed for several years that they were able to do that. A tax on profits in those cases was thus a tax on capital. The directors had suggested that the Act should give special protection to such companies, but the only concession they had been able to obtain was that those cases should receive special consideration. The revenue account showed a balance of profit of £209,000, or about £11,000 more than in the preceding year. After paying the debenture interest of £91,259 and the dividend of 6 per cent. for the year upon the cumulative participating preference stock, requiring £42,704, they had a balance of £75,146 besides the amount of £71,398 brought forward. Last year nothing was placed to reserve, but the directors thought that an addition of £20,327 to reserve, raising it to £410,000, was the right thing to do this year. Owing to the rearrangement of capital, they were able to pay a dividend of 3 per cent. on the new ordinary shares, and the carry-forward would be increased by £15,030, to £80,428. With regard to the dividend on the new ordinary stock, it might be remembered that when the scheme of rearrangement of capital was formulated he intimated that in the first year after the scheme had been carried through they would be in a position to pay on that stock a dividend of 4 per cent., and that they might expect the dividend gradually to improve. The accounts showed that their estimates were well founded, and that they could easily pay this year a dividend on the ordinary stock of more than the 3 per cent. suggested. The estimate, however, was made before the outbreak of war, but he still believed that they would not be disappointed in future. It was important that they should keep in a liquid form some part of their profits, especially as the present was not a favourable moment for the realisation of their investments. In due course they would receive about £80,000 in respect of their holding in the Devonport Tramways Company, which had been acquired by Plymouth Corporation. Under normal conditions he believed that the London and Suburban Traction Company, which was formed three years ago to amalgamate certain tramway, omnibus, and lighting companies, would have a successful career. The work of co-ordination had been carried further by the removal of the offices to Electric Railway House, where the companies had the advantage of the organisation provided by the Underground Railways Company. The loss to the company of the Bombay Electric Supply and Tramways, owing to the burden of double income-tax on small Indian shareholders, was much

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regretted. With regard to the manufacturing departments, it was a hopeful augury that the commercial community within the British Empire was now thoroughly aroused to the necessity of being prepared to resist a renewal of the invasion to which their interests were exposed before the war.—Mr. C. Shirreff Hilton seconded the motion for the adoption of the report and the payment of the dividends.—The Chairman, in reply to points raised in a congratulatory discussion, said that the increase of fares was not an easy matter to deal with. Frequently an increase led to smaller profit, but there was no doubt that the services their companies were rendering to the public were not adequately remunerated. Among the many things that Parliament would have to deal with would be the important question whether public service enterprises that had done such excellent work for the poorer section of the community should not receive more liberal treatment at the hands of Parliament. In view of the altered circumstances after the war the Board of Trade had appointed an electrical committee for the consideration of these various matters, and the company's managers were preparing evidence to be submitted to that committee.

FINANCIAL REPORTS AND MEETINGS.

Provincial Tramways.—An interim dividend of 8d. per share on the ordinary shares for the year ending September 30 next will be paid.

Yorkshire (West Riding) Electric Tramways Company, Limited.—The directors paid on July 1 an interim dividend of 3 per cent., being at the rate of 6 per cent. per annum, on account of dividend accrued on the 6 per cent. cumulative preference shares.

South Metropolitan Electric Tramways Company.—The annual report gives the revenue for 1915 as £69,286, and after providing for all expenses and adding £4,500 to the renewals fund, there is a divisible balance of £15,488. A dividend of 5 per cent. is proposed on the preference shares for 1914, and 1 per cent. on account of the past year, adding £4,500 to the reserve, and carrying forward £812.

Jarrow and District Electric Traction Company.—During the past year the revenue totalled £8,855, an increase of £986. After meeting expenditure, debenture interest, and placing £800 to renewals, the balance available was £2,911, plus £1,026 brought forward. The directors have declared a dividend of 4 per cent. on the ordinary shares, while £900 has been placed to reserve, and £1,040 carried forward.

Wemyss District Tramways Company.—The report shows a profit for the year (including the balance brought forward), after providing interest on the mortgage stock and placing £200 to the fund for redemption of that stock, of £5,774, less £1,746 paid in dividend on the 6 per cent. preference shares. The directors propose a dividend of 7½ per cent., less income-tax, on ordinary shares, an additional 1½ per cent. on preference shares, carrying £2,000 to general reserve and £940 to next year's accounts.

A Year's War Traffic at Southampton.—The receipts of the Corporation tramways for the year ended March 31 totalled £78,064, or £10,022 more than for the previous year. The number of passengers rose by 2,228,651, although the car mileage decreased by 66,929. A decrease of 4,499 units was recorded in the energy used. In the receipts there was an increase of 1·862d. per car-mile, while the cost of energy per car-mile increased by ·045d. The general manager advises that a charge should be made for parcels, other than luggage, exceeding 28 lbs.

Madras Electric Tramways, Limited.—Presiding at the annual meeting, Mr. A. M. Quill stated that for the year 1915 there was an increase of 6·4 per cent. in traffic receipts and an advance of 5 per cent. in passengers. The special renewals of permanent way had been practically completed. Recently a resolution was passed by Madras Corporation praying the Government to increase the track rent paid by the company. If this petition were granted it would be a breach of faith. The fares were much lower than they were entitled to charge. The dividend, which the directors recommended should be increased to 6 per cent., could not be regarded as extravagant. The average return since the company was incorporated was only 3·3 per cent. The directors were awaiting the decision of the Government regarding the proposed extensions of the tramways. The Corporation had approved of the routes.

Mansfield and District Tramways.—Mr. A. R. Holland, who presided at the annual meeting, said the business had continued steadily to increase, and this gradual building up of the position enabled them to recommend a dividend of 7 per cent. on the ordinary shares, and to carry forward practically the same amount that was brought in. This result had been obtained after providing for maintenance, repairs, and renewals. The results for the year to date showed a slight increase. In connection with colliery developments, the directors had the matter of possible extensions under consideration. Meantime temporary arrangements had been made for the convenience of troops and for the large number of colliers. During the year they carried 5,000,000 passengers, and the cars ran more than 560,000 miles. The reserve account, with the additions during the year, amounted to £13,500, and a portion had been invested in war loan stock.

Walsall Corporation Tramways.—For the year ended December 31 last, the passenger receipts were £39,551, equal to 12·908d. per car mile. The total revenue was £40,291 (13·217d. per car mile). Passenger receipts showed an increase of £6,040, and were the highest on record. Compared with the first year of the undertaking the increase was £14,427. The car mileage was 731,640, and the passengers 7,886,190, exclusive of over 8,000 soldiers who were carried free. The working expenses were £22,955 (7·530d. per car mile), an increase of £1,133. Alderman J. Cope, chairman of the Tramways Committee has informed the Council that the amount paid in wages was £12,526, equal to 5s. 11d. of every sovereign received. Allowances had been made to the dependents of employees serving with the colours to the extent of £854. The profit for the year was £7,886. Nearly half the capital borrowed in respect of the undertaking had been repaid.

Tramways Light and Power Company.—The report for 1915 states that the receipts, including £1,712 brought in, amount to £32,213, and after providing for administration, loan and debenture interest, the profit is £19,324. The directors propose a dividend on preference shares for year of 6 per cent., less tax, and carry forward £3,348. Viscount Chilston presided at the third annual meeting. In proposing the adoption of the report, the chairman said the earnings were derived from the Derbyshire and Nottinghamshire Electric Power Company, Nottinghamshire and Derbyshire Tramways Company, Leamington and Warwick Electrical Company, Leicestershire and Warwickshire Electric Power Company, Midland Electric Light and Power Company, Limited, and Cheltenham and District Light Railway Company. The various undertakings had only to continue the present rate of earnings to show a considerable increase during the current year. During the year additional consumers for power had been obtained to about £10,000 per annum. The total sum to be dealt with was £32,214. After meeting general expenses and debenture and loan interest, there was a balance of £19,324, compared with £18,329 the preceding year, although £2,000 more had been paid in debenture and loan interest.

Torquay Tramways Company.—The report for the year ended December 31 last showed a profit of £13,691, and after deducting debenture interest and allowance to dependents of employees who had joined the colours, there remained a balance of £6,510. To this has to be added £897 carried forward at December 31, 1914. The directors recommended that the total balance of £7,407 be dealt with as follows:—Reserve and renewals account, £2,500 (bringing this account up to £13,000), depreciation on furniture, fittings, plant and tools, £93, dividend of 3¼ per cent. on ordinary shares, £3,900, carry forward, £914. For the previous year the dividend was also 3¼ per cent. Mr. W. B. Cownie, managing director, who presided at the annual meeting, said the traffic revenue afforded a good testimony to the stability of the undertaking, notwithstanding the withdrawal of all railway facilities for excurison traffic. The receipts for the present year, to February 9, showed an increase of £253. Prior to the outbreak of the war the directors placed an order for two motor omnibuses to act as feeders, particularly during the summer months, when they could have earned a good profit. Owing to non-delivery the order was cancelled. The total operating cost per car mile was 6·09d. as compared with 6·36d. for 1914.

The United Electric Tramways of Monte Video.—Mr. G. A. Touche, M.P., presiding at the twelfth annual meeting, said that the directors had again to report a year of difficulties and troubles. The shortage of tonnage had increased freight rates enormously, and the coal situation had occasioned much anxiety. Failing British coal, it had become necessary to rely on American, although it was not of the same steaming qualities as Welsh coal. The cost delivered in Monte Video would be approximately 105s. per ton, of which 85s. represented freight. This compared with the pre-war price of 40s. 6d. In the circumstances the directors felt unable to recommend the payment of any dividend on the ordinary shares. As to the proposal to acquire the undertaking by the Municipality, they had informed the authorities that if they were prepared to make a definite offer on a fair and reasonable basis of valuation, the directors would give the offer consideration. A cablegram had been received stating that the Government had made a proposal, and that information was being sent by mail as to its terms. The report gave the net revenue for the year as £120,220, and the sum receivable from La Sociedad Comercial de Monte Video in respect of revenue was £111,413. After providing for debenture interest, etc., £51,692 remained, while £12,973 was brought forward. Dividends amounting to 6 per cent. are proposed on the preference shares, appropriating £26,062 for redemption and contingencies, and carrying forward £13,103.

Imperial Tramways Company.—The report for 1915 states that the gross receipts of the Middlesbrough, Stockton and Thornaby tramways amount to £66,529, as compared with £63,562 for the preceding year, an increase of £2,967. The number of passengers was 12,299,280, against 12,261,624, an increase of 37,656. The net profit is £15,432, as compared with £17,604 for the corresponding year. The traffic receipts have continued to develop in spite of the difficult conditions prevailing throughout the districts served by the tramways and omnibuses. Since the beginning of the war 84 per cent. of the employees have joined the forces or attested.

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The special allowances granted to dependents of employees on active service amounted to £1,531. The Corris Railway Company shows a decrease in receipts of £428, almost wholly due to the absence of tourist traffic, but the working expenses have been further reduced, the decrease being £780. The Imperial Tramways Company holds 122,230 5 per cent. cumulative preference shares of £1 each and 112,451 ordinary shares of £1 each in the London and Suburban Traction Company, and has received the full dividend for the past year on the preference shares, but the revenue of that company for the year 1915 was not sufficient to permit the payment of any dividend on the ordinary capital. The company's net revenue account for the year shows an available balance of £25,760, and after payment of interest on the debenture stock for the year and an interim dividend on the preference shares in respect of the half-year to June 30 last, amounting together to £17,075, it is proposed to appropriate the balance as follows :—Dividend at 6 per cent. per annum on the preference capital (less income-tax) paid January 1 last, £5,025 ; dividend for the year at 2 per cent. on the ordinary capital (less income-tax), £3,467 ; carrying forward £194.

Birmingham and District Power and Traction Company.—At the annual meeting the chairman (Mr. C. S. B. Hilton) said the net revenue from tramways was £56,545, or £6,963 better than in the previous year, while interest and dividends on investments showed £7,179 increase. The entire revenue of £106,024 showed the substantial increase of £14,202, while on the expenses side there was very little increase. Too much importance, however, must not be attached to that small increase in expenses, as it had been impossible during the war to spend as much as is usual in repairs and maintenance. The final result was that, after making a provision of £9,000 for renewals, or £5,000 more than in 1914, placing £5,000 to reserve, as against £2,000, and providing the full 6 per cent. dividend on the preference shares to December 31, the company was able to pay an increased dividend of 1 per cent., or 4½ per cent. for the year on the 7 per cent. preferred ordinary shares, and to increase the carry forward by £1,591 to £2,551. In referring to the scheme for capital reduction, the chairman said that the experience of the past twelve years had shown that tramway undertakings operating on the modern low fare basis were incapable of carrying the burden of capital represented by displaced systems of traction. There was an insufficiency of profits. The directors proposed therefore to cancel £325,000 of deferred ordinary shares and to convert the remaining 25,000 deferred ordinary shares and the whole of the £350,000 preferred ordinary shares into ordinary shares. The British Electric Traction Company, which held all the deferred shares, would become entitled to participate at an earlier date to a small extent in such distribution of profits as in future might be made after payment of debenture charges and preference dividend. Alluding to the omnibus undertaking, the chairman remarked that it had for the first time paid a dividend on the ordinary shares, after making full provision for depreciation.

Newcastle Chairman's Review of the Year.—Councillor R. Mayne, chairman of the Tramways Committee, in presenting the annual statement of accounts to the Town Council, said that owing to the abnormal conditions the figures showed very different comparisons with those of former years. The traffic expenses amounted to £93,831, an increase of £14,503, of which 87·40 per cent. was incurred in wages, the remainder being due to war bonuses. Uniforms had cost more owing to the employmentof women conductors, the men they displaced having been already equipped during the year. General expenses amounted to £34,745, an increase of £9,165, of which £6,000 was due to the rates; the balance to third party claims and insurance against aircraft. Working expenses, at £38,055, were £6,935 higher, mainly owing to the increased cost of maintenance of cars. Power expenses amounted to £17,436, an increase of £3,946, due to the increased cost of fuel. The total expenses were £192,049, an increase of £32,191. The total income was £324,695, an increase of £31,431. The gross profit at £132,046, compared with £132,805. Adding interest, there was a total of £135,764, as compared with £136,003. This sum will be disposed of as follows :—Special rents, etc., £1,697 (last year £1,559), income-tax £10,834 (last year £5,412), interest and redemption of the loan capital £75,000 (last year £72,930), interest and redemption on old horse tramways £1,418 (last year £1,381), contribution to rates out of profits £8,164 (last year £18,000), purchase of motor omnibuses and other items £117 (last year £3,599), war service allowances to men on active service and to their dependents £13,144 (last year £4,365), claims reserve to £2,000 (last year £935), making a total of £112,375 (last year £111,181), leaving a net surplus to be appropriated towards the reserve and renewals funds of £23,389 (last year £24,822). The expenditure on renewals to permanent way, additions to plant and cables provided to meet the increased load due to the workmen's traffic, amounted to £16,643. The purchase of land at £4,400 brought the expenditure to £21,652. The whole of the surplus money was practically absorbed, with the exception of about £2,000 which would be carried to the reserve and renewals fund, raising it to £77,000. In the preceding year the renewals and reserve fund had been drawn upon to the extent of £19,682, while in the year under review they had fully covered all their outgoings out of income, which Councllor Mayne regarded as highly satisfactory.

Record Receipts at Birmingham.—The result of the increased fares instituted last August is seen in the accounts of the tramways committee for the year ended March 31 last. The traffic receipts amounted to £765,036, which is a record, the previous highest being £640,091 in 1915. The total increase is £124,945, or 19·5 per cent. in excess of the previous highest ; £2,480 of the increase is in respect of the Warwick Road tramway, which was opened in February. The miles run were 14,151,000, as against 14,232,000. On the expenditure side the figures are again abnormally high, due to the increased cost of labour and materials, the total increase in the expenses being £60,000, or 12·7 per cent. in excess of the previous year's figures. After paying interest and sinking fund charges the surplus is £107,749, as against £47,596, of which £57,749 has been carried to reserve fund account, and the balance, £50,000, is transferred in relief of the rates. The latter sum, which shows an increase of £20,000, is the largest amount received from any of the trading undertakings. During the year £53,543 has been charged against the reserve fund in respect of reconstruction of permanent way. It has also been considered advisable to charge against this account the cost of the omnibus undertaking. The capital expenditure on the tramways during the year was £17,523. The following is a summary of the results for the year in comparison with the two previous years :—

	Year ended March 31.		
	1916.	1915.	1914.
Capital expenditure	£2,489,431	£2,472,938	£2,334,437
Amount outstanding	£1,934,790	£1,940,158	£1,913,559
Traffic revenue	765,036	640,091	628,016
Total revenue	771,117	647,014	635,471
Working expenses	534,080	473,879	445,507
Gross balance	237,037	173,135	189,964
Net profit	50,000	47,596	75,972
Passengers carried	163,258,584	149,443,199	146,930,986
Fare per passenger	1·12d.	1·03d.	1·03d.
Car mileage	14,151,683	14,232,902	14,268,244
Units per car-mile	1·9	1·7	1·7
Power cost per car-mile... ...	2·17d.	1·912d.	1·913d.
Traffic receipts per track-mile	£6,204	£5,384	£5,482
Traffic receipts per car-mile ...	12·974d.	10·793d.	10·564d.
Expenses per car-mile ...	9·057d.	7·991d.	7·494d.
Ratio of working expenses ...	69%	73%	70%
Total track mileage	123 miles	118 miles	114 miles

Manchester Corporation Tramways.—The report for the year ended March 31 was adopted by the Tramways Committee on June 27. Mr. J. M. McElroy, general manager, states that in the early stages of the war the undertaking was adversely affected, but during the past year a remarkable recovery took place. The ordinary working expenses show a decrease on the figures of previous years, but the total expenditure was increased consequent upon the large payments made for war service allowances, etc., which amounted to £92,808, mainly in respect to 2,174 men who had joined the colours up to the close of the financial year. The net result shows that after paying £100,000 in relief of the rates, it was only possible to pay £21,181 to the reserve, renewals and depreciation account, as against £99,000 which would have been provided in normal times. The department had paid over £1,000,000 in relief of the rates since 1902. The following is a summary of the results of the past three years :—

	Year ended March 31.		
	1916.	1915.	1914.
Capital expenditure	£2,231,548	£2,216,009	£2,130,904
Amount outstanding	£1,626,583	£1,648,183	£1,616,131
Traffic revenue	£925,301	£887,763	£911,223
Total revenue	£939,469	£901,875	£925,310
Working expenses	£654,247	£604,205	£585,224
Gross balance	£285,222	£297,670	£340,086
Net profit	£100,000	£100,000	£103,090
Passengers carried	209,877,667	202,768,420	205,608,741
Fare per passenger	1·06d.	1·06d.	1·06d.
Car-mileage	18,486,440	19,155,051	19,463,646
Units per car-mile	1·553	1·562	1·543
Power cost per car-mile ...	1·687d.	1·608d.	1·597d.
Traffic receipts per track mile	£5,032	£4,835	£5,054
Traffic receipts per car-mile ...	12·013d.	11·123d.	11·236d.
Expenses per car-mile ...	8·494d.	7·570d.	7·216d.
Ratio of working expenses ...	59·76	63·47	63·25
Total track mileage	203·31	203·31	202·48
Number of cars in stock ...	685	683	662

The total revenue per car-mile was 12·197d., as against 11·300d., while the working expenses for the two past years were 7·289d. and 7·172d., the balance for the year 1915-16 being 4·908d., as against 4·128d. for the preceding year. The main items of the working expenses were as follow :—Traffic, 3·398d. (decrease, ·022d.) ; general, 1·143d. (increase, ·068d.) ; repairs and maintenance, 1·061d. (decrease, ·008d.) ; power, 1·687d. (increase, ·079d.) ; total, 7·289d., or an increase of ·117d. The increase in the general expenses is due to the greater amount paid in local rates, and the increase in power expenses is owing to the advance in the price of electrical energy, consequent upon the increased coal costs. The motor omnibus accounts, showing a balance of £1,083 carried to the tramways account, are given elsewhere in this issue.

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CONTRACTS AND ORDERS.

The Stirling Boiler Company have received an order from West Hartlepool for a water-tube boiler.

Southampton Council have placed a contract with Jenkins and Company for a coal-breaker, at £147 15s.

Wolseley Motors, Limited, have supplied a number of motor cars to the stores department of the India Office.

W. C. Yuille and Company have received a contract for the supply of wall plug sockets, etc., for Glasgow Tramways Committee.

Clayton and Shuttleworth, Limited, of Lincoln, have received a contract to supply a number of steam vehicles to the War Office.

The Motor Rail and Tramcar Company, Lombard Street, E.C., have supplied petrol tractors and parts to the War Department.

Hadfields, Limited, have received an order from Bradford Tramways Committee for 100 special steel wheels and tires with axles, at £19 11s. 6d. per set.

The Victorian Railways Department have accepted the tender of the British Insulated and Helsby Cables, Limited, for three-core cables for Newport workshops.

The Brush Electrical Engineering Company, Limited, have received an order for two 150 k.v.a. and one 250 k.v.a. three-phase transformers from Bradford Corporation.

Willans and Robinson have an order for a turbo-alternator with condenser and auxiliary plant from Wolverhampton Corporation. The amount of the contract is £19,000.

The Z Electric Lamp Manufacturing Company have obtained a contract for twelve months for the supply of Z drawn-wire metal filament lamps from the Great Northern Railway.

Jowett Motor Manufacturing Company have received an order from Bradford Corporation for two General Vehicle electric trucks for coal and ash conveyance at the electricity works.

Briggs, Jones and Gibson, Limited, Manchester, have received a contract from Salford Council for the supply of women tramway inspectors' and conductors' uniform clothing during the year ending March 31, 1917.

Portsmouth Council have accepted the following tenders for the supply of uniforms for the women tramcar conductors :—J. Canton and Company, London, clothing ; C. Dillingham and Son, Luton, caps ; Beng Brothers, Portsea, caps.

Rawtenstall Council have accepted the following tenders :—The British Westinghouse Company, transformer and switch panel ; British Thomson-Houston Company, switchgear ; W. T. Glover and Company, cables ; Oates and Green, conduits.

Wolverhampton Electricity Committee have recommended the acceptance of the tender of the Stirling Boiler Company for two water-tube boilers and superheaters at £6,606, and with the Underfeed Stoker Company for two sets of mechanical stokers at £1,907.

Glasgow Council have accepted the offers of MacKinlay, Limited, and R. M. Easdale and Company, for the purchase of scrap materials in the tramways department, and have placed a contract with Babcock and Wilcox, Limited, for four sets of water-tube boilers, at £10,632.

Rochdale Council have awarded the appended contracts for extensions at the electricity works :—E. Green and Sons, Wakefield, economisers ; Sturtevant, Limited, London, induced-draught plant ; R. and T. Howarth, Rochdale, chimney ; Dempster and Sons, Elland, ash-handling plant.

Walthamstow Council have placed the following contracts :—Paterson Engineering Company, Limited, water-softening plant for the electricity works, £750 ; Cammel, Laird and Company, eighteen tramcar axles, £5 16s. each ; P. R. Jackson and Company, Limited, twenty-four commutators, £5 10s. each.

Shepherd's Parging Block Company, Limited, of Milkstone, Rochdale, write that among recent users are included the Dunfermline, the Scarborough, and the East Ham Corporation Tramways, and the Midland Railway Company. Sixth and seventh repeat orders from various customers are being supplied, and there is very satisfactory evidence of the economy which can be obtained from the use of the company's block parging.

Salford Council have ordered a permanent way wagon body from the United Electric Car Company, and have placed the following contracts :—British Westinghouse Company, Limited, auxiliary steam turbine ; G. and J. Weir, Limited, two roto-feed pumps ; William Gornall, erection of sub-station building and construction of machine foundations ; British Westinghouse Company, Limited, three-phase e.h.t. switchboard ; Stewarts and Lloyds, Limited, mild steel pipes and separator ; Stanton Ironworks Company, Limited, cast-iron pipes and valves. These contracts are in connection with a 5,000 KW. turbo-alternator to be supplied by Willans and Robinson, Limited.

PERSONAL.

Councillor Kensett has been appointed chairman of West Ham Corporation Tramways Committee.

Mr. R. H. Wilkinson, general manager, Huddersfield Corporation Tramways, has been granted an increase in salary from £400 to £500.

Alderman J. H. Corke, Mayor of Portsmouth, one of the King's birthday knights, was for some years chairman of the tramways committee.

Mr. E. W. Moir, one of the new baronets, and a partner in S. Pearson and Son, Limited, contractors, is the representative of the Ministry of Munitions in the United States.

Mr. F. Dudley Docker, C.B., chairman of the Metropolitan Carriage, Wagon and Finance Company, Limited, has joined the committee of the Council for the Organisation of British Engineering Industry.

Mr. F. C. Harrison has been appointed a representative of the London County Council on the Permanent Way and Building Conciliation Board, in place of Mr. Cooper Rawson, who has resigned.

Mr. A. B. Mountain, borough electrical engineer, Huddersfield, has resigned, but is to be retained as consulting engineer. Mr. J. W. Turner, who has been Mr. Mountain's chief assistant, has been appointed borough electrical engineer.

The Hon. Arthur Stanley, M.V.O., M.P., was one of fifteen civil recipients of C.B., Order of the Bath, on the occasion of the King's birthday. The honour is a well-merited recognition of Mr. Stanley's arduous labours on behalf of the Red Cross organisation.

Mr. A. R. Owen, tramways and marine claims superintendent in the tramways department of the London County Council, has been employed on work under the Admiralty since the outbreak of the war. The Council on May 30 approved of the grant of leave of absence to the officer without pay and on the conditions reported on May 11, 1915.

Mr. J. S. Brodie, the new president of the Institution of Municipal and County Engineers, has been borough engineer of Blackpool since the year 1900. From 1877 to 1884 he was engaged as an assistant on the Liverpool Corporation tramway works. Elsewhere we report a reference that he made in his presidential address to the tramway and petrol omnibus controversy.

Mr. William Marsh, general manager and engineer, Brighton Corporation Tramways, and the staff were highly complimented by Councillor Martin, chairman of the Tramways Committee, when he submitted to the Council the report on the past year's trading. The manager and the employees, observed the chairman, had carried on the undertaking in a highly creditable manner under abnormal conditions.

Mr. Robert Watson has resigned the post of manager of Musselburgh Electric Tramways Company, which he had held for three years. Prior to that he was for ten years secretary of the National Electric Construction Company, Limited, and of its subsidiary companies, including the Musselburgh Company. The new manager at Musselburgh is Mr. E. J. Walsh, at present engineer of the local company, who will act as manager and engineer.

Mr. David James, general manager, Swansea Improvements and Tramways Company, and the whole of the staff and employees, received the thanks of Mr. C. G. Tegetmeier, chairman of the company at the annual meeting. The chairman remarked that the difficulties in carrying on the business with a very much depleted staff had been considerable, and had involved very much increased work, which had been cheerfully given by those who had had to remain.

Mr. F. A. McCarty has been appointed general manager and engineer to Melbourne Tramways Board, which will take over the undertakings of the Tramways Company on July 1. The questions of revision of fares and the advisability of electrifying the cable lines will then be considered. The Brunswick and Coburg Tramways have applied to the Board for permission to make an extension to Lonsdale Street, substituting electric for cable traction on half a mile of the route.

Mr. E. Cross, electrical engineer and tramways manager of Rotherham, has been granted an increase in salary of £50 per annum, and he will be entitled to a further increase of £50 in January next. Alderman Winter, chairman of the Electric Light and Tramways Committee, in moving the recommendation, spoke highly of the services of Mr. Cross. Up to 1904 they had employed a consulting engineer, but since then the work has been done entirely by Mr. Cross, and he had saved the Corporation thousands of pounds. Mr. Cross had been with them fifteen and a half years, and since 1905 had controlled both the tramways and the electricity undertakings.

Mr. Percy Priestley, on leaving Rawmarsh to take up the position of general manager, Oldham Corporation Tramways, has been presented with a solid silver tea-service bearing the following inscription :—" Presented to Mr. P. Priestley, engineer and manager of Mexbro' and Swinton Tramways, by the employees, staff, and a few friends, on his leaving to take up the position of general

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manager of Oldham Corporation Tramways." Alderman D. L. Winter, J.P., the local director, presided, supported by Mr. W. Mitchell (commercial manager), Mr. M. McLeod (traffic superintendent), etc. The chairman said he became local director in 1908, a year after Mr. Priestley joined the company, and he could affirm that that gentleman had acted as a friend to every one of them. During the war he had had to contend with the difficulties imposed by scores of the employees joining the forces. Since its inception the company had never had any troubles with the men, and Mr. Priestley was leaving with the goodwill of all who knew him. He asked him to accept the present as a token of great esteem and affection. Inspector Long, Councillor E. J. Twigg (Rotherham), and several employees also spoke. In reply, Mr. Priestley said if he could take his present staff to Oldham he would not have the slightest thing to fear.

Mr. George Kidd, general manager, British Columbia Electric Railway Company, Limited, is the subject of the portrait gallery in a recent issue of the *Brill Magazine*, issued by the J. G. Brill Company, Philadelphia, and 110, Cannon Street, London. Mr. Kidd was born in Sheffield, England, in 1874, and his first position in business life was with a firm of chartered accountants at Nottingham. In 1907 he became connected with the electric railway business as secretary of the company for which he now acts as general manager. Subsequently he was appointed comptroller, and later he left the London office and took charge at Vancouver. Mr. Kidd held that position until May 6, 1914, when he became general manager of the company. We may add that his arduous labours during the past two years of retrenchment and negotiation with local authorities, necessitated by the depression, won praise from the chairman of the company at the last annual meeting. Mr. Kidd's view of the position may be gathered from the following observations attributed to him :—" The days have gone past when a public company could afford to ignore public opinion as expressed by the popularly elected bodies. I believe that the general sense of fairness that always ultimately prevails in enlightened communities will eventually adjust the balance properly between the needs of the people and the rights of the investors. The period of transition may be a very trying time for many companies, and it is important that officials of companies should, while doing all they can to please the patrons of the utility, also lose no opportunity of pressing for fair treatment for their investors."

Mr. James Pearson, whose death is reported at the age of sixty-five years, was for some years chairman of the Blackpool Lighting and Tramways Committee.

Mr. Charles Challiner, joint managing director of the Shrewsbury and Challiner Tire Company, Limited, of Manchester, London, Birmingham, and Sydney, died suddenly on June 10 at Manchester. Mr. Challiner, who was 67 years of age, was trained as an engineer, and thirty years ago he started business in fitting rubber tires to hansom cabs. In 1900 the firm was amalgamated with the Shrewsbury and Talbot Cab and Noiseless Tire Company. With the development of the motor industry the business has assumed great dimensions. Mr. Challiner was the inventor of the cross-ribbed tire for the prevention of skidding by fire engines. Three sons of the late Mr. Challiner are engaged in the motor tire trade, Mr. C. S. Challiner being secretary of the company.

WITH THE FORCES.

Mr. Shepherd, assistant engineer, Mexborough and Swinton Tramways Company, is serving with the British Force at Salonika.

Mr. H. G. Wigzell, assistant secretary to the Automobile Association and Motor Union, has been gazetted to the mechanical transport section of the A.S.C.

Mr. E. E. Sharp, of Messrs. Chamberlain and Hookham, and Venner Time Switches, has been granted a commission, and is at present at the Ordnance College, Woolwich.

Bombardier W. Bates, a Halifax tramcar conductor, has received the military medal for gallant conduct at the front. He was a reservist, and went to France at the outbreak of the war.

Mr. C. W. Hill, a director of Messrs. Scholey and Company, Limited, who was formerly general manager of Bournemouth Corporation Tramways, has become an Engineer-Lieutenant in His Majesty's Navy.

Corporal C. Angulatta, who was a conductor on the Cardiff Corporation Tramways, and joined the army in September, 1914, has been awarded the military medal for bravery whilst throwing bombs.

Lewis Q. Verlander, who was for eight years a conductor on the Brighton Corporation Tramways before his enlistment, and is now second yeoman of signals in the Royal Naval Reserve, has been awarded the D.S.M.

Lance-Corporal H. Williams, of the 7th King's Own Lancaster Regiment, who was a conductor on the Salford Corporation tramways, has been awarded the new military medal for bravery in the field. Corporal Williams saw service in South Africa during the Boer War.

Professor J. H. Dobson, general manager of the electric supply, tramways and gas departments of Johannesburg Corporation, has been appointed major in command of two Pioneer Companies for service in East Africa. The corps will comprise men who are familiar with the use of explosives.

Mr. H. E. Ellis, borough electrical engineer of South Shields, has been refused permission by the Electricity Committee to join His Majesty's Forces. While appreciating very highly the patriotic action of Mr. Ellis, the committee regrets that in view of the responsible position which he holds, it is unable to give him leave of absence.

Glasgow Employees' Patriotism.—According to the report of the Tramways Committee for the year ended May 31, 2,811 members of the staff had joined the Forces, inclusive of 633 Territorials and Reservists who were called up directly war was declared. The committee regret to state that intimation has been received of the deaths of 113 employees.

Leeds Employees' War Distinctions.—At the end of the past financial year there were 473 employees of Leeds Tramways department on active service. Motorman J. Band has been awarded the D.C.M., and Inspector R. Dalby and Conductor W. Geldard have been mentioned in despatches. Ten men, including Inspector Dalby, have lost their lives.

Sergeant J. W. Smith, 1-5th Royal Scots, has been awarded the Military Medal. He was mentioned in Sir Ian Hamilton's despatches for having extinguished a fire caused by the enemy which had broken out in a stack of ammunition, thereby preventing a serious explosion. Sergeant Smith was before the war a driver with the Edinburgh and District Tramways Company.

Mr. A. H. Seabrook, electrical engineer and general manager, Marylebone Corporation electricity undertaking, having completed the duties upon which he has been engaged for the Metropolitan Munitions Committee, has been given leave of absence by the Council in order that he may take up a commission. He will serve in a department where his experience in munitions work will be utilised.

Hull Conductors' Medals for Gallantry.—Sergt. H. Brien, East Riding Field Company, R.E., has been awarded the D.C.M. for conspicuous bravery, devotion to duty, and coolness under continuous heavy shell fire. Lance-Sergt. F. F. Robson, 2nd Grenadier Guards, has gained the Military Medal for gallantry in the field. Both soldiers were conductors on the Hull tramcars, and the Tramways Committee have directed the manager to write to them and compliment them.

Sergeant E. Mann, King's Royal Rifles, who has been for ten years in the employ of Manchester Tramways Committee, has been awarded the D.C.M. for rescuing wounded comrades in France and holding wire entanglements against the enemy on two occasions. He has thrice been mentioned in dispatches. The medal was handed to him by Alderman J. Bowes, chairman of the tramways committee, on July 2, when Alderman A. W. Chapman (vice-chairman), Alderman Pogson, Councillor Day, and Mr. J. M. McElroy also complimented the gallant recipient.

Mr. C. W. Goodman, elder son of Mr. W. G. T. Goodman, chief engineer and general manager of the Adelaide Municipal Tramways, enlisted for active service immediately he had completed his engineering course at Adelaide University, where he was graduated with the degree of B.E. He is now a lieutenant in the Engineers, and was recently in command of the Engineers in camp, but he expects to go to the front shortly. Mr. R. G. Goodman, a younger son, a medical student, who went to Egypt last November in the A.M.C., has now been given a commission in the A.I.F., and is in France.

Motorman W. Middleton, South Shields Corporation Tramways, who was serving on a warship that took part in the battle off Jutland, has been presented with a silver watch and a silver cigarette case by the employees and staff of the tramways department. Alderman W. G. Wylie, chairman of the tramways committee, in handing the gifts to the recipient, expressed the pride felt by all connected with the tramways in having a representative engaged in the fight. They hoped he would be spared to take up his former position amongst them. Mr. W. Bunting, who presided, said they were following out a custom of giving a hearty welcome to one who had returned to them on leave from active service, and of giving to him a slight token of their high regard and admiration. There was a large attendance of the employees and their wives and friends, Mr. J. C. Whiteley, the general manager, being one of the supporters of the chairman.

Private A. A. Chattock, Royal Warwickshire Regiment, who was killed in France on June 4, was the only son of Mr. R. A. Chattock, city electrical engineer of Birmingham.

Sergeant J. J. Stephenson, signalling instructor in the South Lancashire Regiment, and formerly a motorman on the Nelson Corporation Tramways, has been killed in action. He was mentioned in Sir John French's despatch of January last, and he also served in the South African war.

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TRAMWAY AND LIGHT RAILWAY NOTES.

ASHTON.

THE CORPORATION TO ACQUIRE TRAMWAYS.

Ashton Town Council have decided to promote a Bill in the next session of Parliament to obtain powers for the acquisition of the tramways of the Oldham, Ashton, and Hyde Tramways Company within the areas of Waterloo and Bardsley. The Corporation already have powers to purchase the lines in the borough, and by acquiring the lines mentioned, they will be able to reach Oldham.

BIRMINGHAM.

FUEL DIFFICULTIES AND CURRENT INTERRUPTION.

Owing to the difficulty experienced in increasing the plant at the power station of the Birmingham Corporation, tramway traffic has had to be temporarily suspended four times during the past eight months. On the last occasion, on June 24, suspension occurred for 40 minutes, from 9.40 a.m., while on May 29 there were two cessations of the car services. The first was from 9.25 a.m. to 9.45 a.m. The cars then restarted only to stop for a longer period a short time later. The cutting off of the supply of energy was due to the great demands upon the electric supply department, especially by munition works. Owing to the low grade of the fuel at the generating station more boilers have to be utilised than would be the case if better quality coal could be obtained. The result is that the steam pressure fails, and as there are no spare boilers available, the supply of energy to the tramways has to be cut off.

BRISTOL.

REDUCED EARLY FARE FOR ALL CLASSES.

The Tramways Company have given notice that from July 1 passengers who reach their destinations before 8 a.m. will have the privilege of riding at workmen's fares. In making this concession the directors have been influenced by the fact that there are many travelling to and from the city in the early morning on business or work connected with the war. In notifying the directors' decision Mr. C. Challenger, the manager, says: "These fares are on a very low scale, the usual fare for the long routes to the outskirts of the city being one penny, with two halfpenny sections."

EDINBURGH.

THE COUNCIL'S DEMANDS ON THE TRAMWAYS COMPANY.

Edinburgh Tramways Committee have reported that orders under the tramway lease have been served on the tramway company and Messrs. Dick, Kerr and Company for the renewal and repair of 33½ miles of tramway track, for the repair and overhaul of Shrubhill and Henderson Row power stations, and for the renewal and repair of the whole pulley ways. Inasmuch as the lease of the company does not expire until July, 1919, the committee have deferred a motion recently submitted to them for the appointment of a tramway manager and also of an engineer.

GLASGOW.

TRACK EXTENSION IN SHIPBUILDING WORKS—TOP COVERS AND VESTIBULES—THREE YEARS' COMPARISON OF REPAIRS—TRAFFIC BY-LAW—ROUTE NUMBERS.

An additional junction was made during the past year with the tramway lines in the works of the Fairfield Shipbuilding Company, Govan. The report of the tramways department for the year ended May 31 shows that the city possesses 857 cars, of which number 819 have been fitted with top covers, while 386 are provided with vestibules. In 1914, when the Tramways Committee decided to build 150 additional top-covered cars, the total number of cars was 852, those with top covers numbering 811, and those with vestibules 350. In 1914 43 converted horse cars were sold; the number of such vehicles left is seven. An examination of the reports of the past three years shows an evenness in the amount annually expended for the inspection and repair of cars at the depots and car works. For the past year the total was £55,709, while £41,212 was charged against revenue to meet depreciation. For 1914-15 the figures were £55,965 and £41,192, and for 1913-14, £55,308 and £47,841. The amounts spent on ordinary repairs to the power plant and sundry machinery in each of the three years was £6,678 in 1915-16, £8,138 in 1914-15, and £7,805 in 1913-14, the sums charged against revenue to meet depreciation being £23,045, £23,567, and £32,048. The war has not caused a great fall in the outlay on the upkeep of the track. For the past year the total was £62,175, while £68,681 was set aside to meet the cost of renewal of the track. The respective figures for the two preceding years were £65,875 and £68,228 in 1914-15, and £77,797 and £85,438 in 1913-14. During the three years £18,079, £33,768, and £41,238 were deducted from the permanent way renewals fund to meet the expenditure on renewals. Numerous horse drivers have been fined for failing to observe the new traffic by-law. The previous by-law, which is superseded by the new regulation, referred only to streets where tramways had been laid down, and under it obstruction had to be proved. Under the new order it is an offence for slow-going vehicles to take the centre of any street, whether the road is clear or not, unless there is sufficient reason for doing so. Owing to the war no progress has been made with the scheme for placing route numbers on the cars, but a number of cars have been fitted with transparencies on the upper deck to facilitate checking. Measured as double track, there are 98 miles of tramways in the city, and 149 as single track. In outside districts the Corporation own 47 miles measured as single track.

ILKESTON.

LEASING OF THE TRAMWAYS AND ELECTRICITY WORKS.

Ilkeston Council have decided by 14 votes to 4 to lease the tramways and electricity undertakings for 42 years to the Notts and Derbyshire Tramways Company, who intend to link them up with their tramways, etc. Since their opening in 1903 the tramways have resulted in an average annual loss of £2,500, the total being £32,498. The total length of route is 3·8 miles, and of track 4·3 miles.

LEEDS.

HUGE WAITING LIST OF WOMEN CONDUCTORS—FARES PAID BY BOARD OF GUARDIANS.

It was stated at a recent meeting of the Corporation that the conditions under which women work as conductors were so attractive that there was a waiting list of 1,250 women ready to accept positions. Alderman Wilson said that the conditions offered were relatively good, and it was only through the professional agitators that they were worrying the Council for more money. He did not agree that they should receive the same wages as the men, especially as the Council were paying the wages of the enlisted men. The Children's Committee of Halifax Board of Guardians has considered a letter from Mr. P. H. Bagenal, Local Government inspector, stating that when inspecting the Children's Home, he was informed that one child walked twice a day to and from the Catholic school. At Leeds the Guardians paid tramcar fares, and he suggested that the Board should consider similar action. The clerk was instructed to write inquiring what other Boards of Guardians did in similar cases.

LONDON.

EFFECT OF THE WAR ON TRACK MAINTENANCE—COMPLAINTS IN OUTER SUBURBS—WEST HAM FARE SETTLEMENT.

In the interest of their own traffic, to say nothing of the importance of maintaining safe user of streets by other vehicles, the London County Council's tramways department have managed during the war to maintain their policy of giving prompt attention to the rail and permanent way repairs. Among the items of work recently undertaken in one district was the replacement of rails at a place where a double line is merged into a single line on account of a narrowing of a thoroughfare. The wear on the point of junction is so great that cars, if not very carefully driven, are occasionally thrown off the metals. This particular thoroughfare is one of several in which no harm would have resulted if Parliamentary Committees had been induced to allow double tracks to be laid. In the outer suburbs the problem of maintenance is causing some anxiety to the companies concerned. Ealing Council have been informed by the London United Tramways Company that owing to the shortage of labour and material they are unable to carry out extensive reparation of the track. The company will, however, do their best to keep it in the best state of repair under the circumstances. Brentford Council have resolved to call the attention of the Board of Trade and the Commissioner of Police to the noise created by tramcars owing to the worn condition of the tracks. West Ham Council have at last agreed to the changes in fares recommended by their tramways manager, Mr. J. S. D. Moffet. There will be a universal penny fare—*i.e.*, a penny will be charged for any single journey on any car. All halfpenny fares, except for children, will be abolished. Workmen's return fares will be 1½d. It is hoped that the new arrangement will put the undertaking on a sound basis, and at the same time enable a convenient and adequate service to be maintained.

MANCHESTER.

PROGRESS OF THE DEPARTMENT—DECREASED WORKING EXPENSES AND MILEAGE—CAR CONSTRUCTION SUSPENDED—PARCELS TRAFFIC—FREE CONVEYANCE TO A PARK—ROYAL SHOW TRAFFIC.

The accounts relative to the working of the tramways and motor omnibuses of Manchester Corporation in 1915-16 are reproduced elsewhere in this issue. It will be of interest here to mention some of the items given in the general manager's report: 782 yards of siding and new lines were opened during the year, and 701 yards of track were taken up in Lamb Lane, Parker Street, and North Road. The aggregate length of single track (including lines over which the Corporation are exercising running powers) is 195 miles. The working expenses show a decrease, the total being £561,438, as against £572,441 for 1914-15, but to those figures sums of £92,808 and £31,763 have to be added for allowances made to enlisted employees' families. Fewer car miles, of course, were run, the total being 18,486,440, as compared with 19,155,051 and 19,463,646 in the two preceding years. There was an increase of seven million passengers over 1914-15 and four million beyond the total in 1913-14; 66·92 per cent. of the 209,877,667 passengers were carried for a penny fare, the next fare in popularity being the three halfpenny, at which 10·06 per cent. were carried. It was only by cutting down, from £99,000 to £21,181, the amount paid to the reserve, renewals, and

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depreciation account, that the committee were able to pay the £100,000 required by the City Council in relief of the rates. Of the 685 cars in stock, 351 are single truck, 284 double truck, while 50 are described as combination. Two new cars were put in service and six double truck cars were fitted with covered tops. Consequent upon the Treasury restriction as regards capital expenditure, the construction of car bodies and covers has been suspended. From the conveyance of 1,225,718 parcels, the total receipts were £14,185, the net receipts being £3,405. During the summer holidays the school children are to be conveyed free of charge on the cars to Heaton Park. In its report of the Royal Agricultural Show, the *Manchester Guardian* remarked that on June 30 to July 1 "many complimentary comments were heard about the excellence of the tramway service to the show ground and the cheapness of the fares. The speed with which the cars were filled and despatched citywards during the busiest period of the evening was an agreeable surprise to those who were anxious about catching trains."

NEWCASTLE-ON-TYNE.

Increased Workmen's Fares—Women Employees' Thoughtfulness—Renewals Fund—Later Services.

Smooth working is attending the increase in the fares charged to workmen on the Corporation cars, which came into force on May 21. The increase is threepence in the shilling and eighteenpence books, and twopence on the sixpenny books. Special offices have been opened for some time for the sale of the coupons, and all workmen and workwomen who do not tender coupon tickets have to pay the full ordinary fare. With this regulation all cars hitherto labelled "workmen's car" will be abolished. The women employed on the Newcastle Corporation Tramways have formed a committee to provide comforts for wounded soldiers in the hospitals. The women are subscribing one penny per week each, and collections are also made at the depots. Gifts are also received from the public. Councillor Mayne, chairman of the Tramways Committee, in his annual review of the general manager's report, announced that renewals on a much larger scale than during the past year must be faced as soon as labour and materials become available. The committee aimed at building up a fund of £100,000 to meet accumulated needs. It at present stood at £77,000. The management on June 11 restored the hour by which the services had been curtailed owing to the shortness of labour and the restricted lighting.

PLYMOUTH.

Universal Penny Fare.

The Town Council have adopted the recommendation of the Tramways Committee to institute a universal penny fare when through running of cars to Devonport is established. The recommendation was made on the advice of the manager, Mr. C. R. Everson, whose report on the subject was summarised in our issue of June 10. Mr. Everson estimates that if no additional passengers are carried the loss, based on the previous year's figures, will amount to £617. Alderman S. H. Phillips, chairman of the Tramways Committee, in advocating the proposal in the Council, said that profit was not the object of corporation tramways. Two things had to be borne in mind by a tramway committee: first, making ends meet, and second, the convenience of the public.

SHEFFIELD.

Automatic Trolley Changers—Transfer of the Power Station.

Several automatic trolley changers are being tried at Sheffield as a relief for women conductors. The changers work well as they have done wherever installed, and they should be more generally used. On dark and stormy nights they are a great boon to conductors of either sex, and they save much time. The Local Government Board have introduced a Bill to confirm a Provisional Order granted by the Board to Sheffield Corporation, providing that Kelham Island power station, with the plant, cables, tunnel, etc., used for generating power for the tramways, shall in future cease to be part of the tramway undertaking, and shall be deemed to be part of the electrical undertaking.

SOUTHAMPTON.

Corrosion of Standards—A Preliminary to Universal Penny Fare—Manager's Foresight as Regards Rails.

As the result of an inspection of the tramway standards, serious corrosion was discovered underneath the clips and brackets on one route. These appendages have been removed, and the standards thoroughly scaled. Alderman Dunsford, chairman of the Tramways Committee, has stated that through the foresight of the manager the committee a considerable time ago laid in large stocks of rails, thus saving large sums of money. Rails they bought at £7 10s. per ton he did not suppose could be obtained now. The Council have agreed to a scheme presented by the committee for revision of the penny stages on the basis of equal distances. This scheme, Alderman Dunsford observed, was suggested by the manager, and it was estimated that 20 per cent. of 2d. passengers might be reduced to 10 per cent. The latter number of 2d. fares would be sufficient to keep the finances on the right side. The chairman added that he was not keen on making profits to hand over to the rates, but he was desirous that the balance sheet should be sound. The next move the committee would ask the Council to make would be the manager's scheme for the universal penny fare. Replying to pleas for the working classes who were forced to live away from the town, the chairman said the committee had given them the boon of extended return tickets in the morning.

YORK.

Cost of Permanent Way Maintenance.

A report recently presented to the Corporation by a committee who had investigated the work of the various municipal departments shows that for the tramways permanent way the average cost in 71 other towns per mile for maintenance is £168, and per car mile ·52d. In York the cost per mile for maintenance is £30 and ·12d. per car mile. The low figure for York is accounted for to some extent by the greater age of the tramways in other towns. The cost of road maintenance in York is £149 per mile, or 2s. 9d. per head of population, against an average of £102 and 3s. 7d. per head in 34 similar towns.

PATENT LIST.

Specially abstracted for "The Tramway and Railway World" from the Official Journal of Patents

*** If the inventions have been communicated the names of the communicators are given below in *italics*.

Applications for Letters Patent.

Radiators for motor cars (7,586)—L. N. Anderson.
Support for detachable wheels of motor vehicles (7,692)—T. P. Barnes.
Variable speed gear (7,574)—H. W. Barras.
Securing railway rails in chairs (7,900)—R. Bowen.
Electric motor control systems (7,652)—British Thomson-Houston Company (*General Electric Company*).
Trolley heads for electric tramways (7,595)—W. H. Cottee.
Electrical signalling (7,730)—W. C. Davey.
Lifting jacks (7,800)—J. S. Drewry.
Trailers for carrying long loads (7,801)—J. S. Drewry.
Resilient tires (7,795)—W. T. Clifford Earp.
Trolley heads for electric tramways (7,595)—R. H. Hollingsbee.
Converting pleasure vehicles into commercial trucks (7,739)—W. F. Hudson.
Automatic emergency brakes (7,729)—D. I. Hullett.
Lifting jacks (7,800)—Lacre Motor Car Company.
Trailers for carrying long loads (7,801)—Lacre Motor Car Company.
Electric signalling apparatus (7,016)—F. Ritchie.
Carburettors for petrol engines (8,249)—A. L. Bird.
Prevention of splashing by motor vehicle wheels (8,227)—S. Bowker.
Electric motor control systems (8,128)—British Thomson-Houston Company (*General Electric Company*).
Electric trucks (8,199)—F. J. Decker.
Tramway tracks (7,902)—A. Devrin.
Electric generators for road vehicles (8,232)—A. F. Evans.
Operating levers of motor vehicles (7,957)—C. W. Gudgeon.
Water-cooled internal combustion engines, particularly petrol motors of road vehicles (8,253)—S. H. Hole; also (8,253)—E. Sharman.
Reinforced-concrete railway sleeper (7,982)—F. C. H. Rings.
Means for controlling and varying the speed and power of internal-combustion engines for propelling vehicles (8,137)—J. D. Roots.
Continuous railway tie or sleeper (8,182)—H. A. Rugeroni.
Resilient tires (8,107)—F. C. Shardlow.
Electric traction systems (8,160)—Soc. Anon. dite Ateliers de Constructions Electriques du Nord et de l'Est.
Tires for motor vehicles, etc. (7,987)—J. E. Spagnoletti.
Carburettors for petrol engines (8,249)—G. I. Taylor.
Seats (8,420)—J. G. Brill Company.
Control systems for electric motors (8,360)—British Westinghouse Electric and Manufacturing Company (*Westinghouse and Manufacturing Company*).
Pneumatic tires for vehicles (8,337)—T. Dunn.
Propulsion of motor cars (8,575)—J. B. Edlington.
Rail joint (8,295)—F. E. Harris.
Driving belt or track belt for motor vehicles (8,463)—A. Kegresse.
Conductor's seat for tramcars (8,205)—J. M. McElroy.
Bonnets for motor vehicles (8,432)—J. Weller.
Propulsion of motor cars (8,575)—W. H. Wilkinson.
Extensible car steps (8,763)—A. Arnt.
Radiators of motor vehicles (8,624)—H. H. Clark.
Motor vehicles (8,895)—W. E. Clarke; also (8,895)—C. H. Crawley.
Automobile construction (8,740)—Hayes Diefenderfer Company.
Steering of automobiles (8,799)—E. Massis.
Adjustment of trolley pole of tramcar (8,669)—R. Mercer.
Side-skid preventer for motor cars, etc. (8,774)—A. R. Pilkington.
Clutches and brakes (8,707)—H. S. Hele Shaw.
Motor tire (8,822)—A. Spedding.
Motor vehicles (8,895)—M. E. Starkey.
Rail-joint inspection box (8,595)—R. J. Wright.

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Specifications Published.

1915.

Securing pads to the treads of motor-vehicle brake levers (7,115)—McClure.
Automatic coupling for railway vehicles, etc. (7,217)—Cloud.
Vacuum brake apparatus for railway vehicles (7,318)—Luard.
Electrical transmission for automobile vehicles (7,366)—Daimler Company, Lanchester and Milligan.
Detachable wheels for motor road vehicles (8,558)—Crawley, Clarke, and Starkey.
Resilient tires (12,858)—Pancera.
Fluid-pressure braking apparatus for railways (12,925)—Westinghouse Brake Co.

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Brake-operating mechanism for street cars (14,741)—McWhirter.
Passenger registers for vehicles (17,698)—Priestman.
Differential or balance gearing for motor vehicles (7,557)—Wolseley Motors, Limited, and Leeding.
Automatic car couplers (7,587, 7,588, 7,589)—Willison.
Brakes for road vehicle wheels (9,655)—McMillen and Connolly.
Fittings for enabling additional wheels to be added to the existing wheels of motor vehicles (9,900)—Smith and Hudlass.
Means of obtaining the weight of railway rails, girders, beams, or similar sectional lengths (10,076)—Henry Pooley and Son, Limited, and Dobson.
Apparatus for use in distributing railway, omnibus, and tramway tickets (12,144)—Bishop, Kitson, and Mottershead.
Motor vehicles (16,757)—Bell and Jones.
Spring suspensions for vehicles (3,348)—Soc. des Etablissements Malicet and Blin.
Controlling mechanism for automobiles (6,197)—British Thomson-Houston Company (*General Electric Company*).
Anti-rolling devices for motor vehicles (6,202)—Brophy.
Mounting for wheels of road vehicles (8,044)—Collins.
Mechanism for operating electrically-worked tramway and railway track points (8,318)—Murray.
Vacuum brake apparatus for railway vehicles (9,856)—Gresham.
Puncture-proof band for pneumatic vehicle wheel tires (10,041)—Jorgensen.
Buffers for vehicles (10,567)—Brown Bayley's Steel Works, Limited, and Sanders.
Lifting jack (11,685)—Page.
Change-speed gear (11,781)—Bynoe, Jeffryes, and Sheen.
Actuating signals on and communicating with trains (12,228)—Thompson.
Metallic vehicle wheels (17,208)—Mellersh-Jackson (*Detroit Pressed Steel Company*).
Electric railway systems (2,897)—Brettell (*Leffler*).
Wheels for motor vehicles (11,582)—Jelly.
Fluid-pressure braking apparatus (11,626)—Westinghouse Brake Company.
Railway indicators (13,865)—Benn and Taylor.
Tires of motor cars (16,579)—Blakoe.
Metallic tire for motor cars (17,816)—Sotomayor and Marcenaro.

1916.

In the following list the numbers in italics are those that the specifications will finally bear and under which they will be indexed and abridged before acceptance and finally printed. The application numbers should, however, still be used for correspondence purposes.
Lubricators and particularly lubricators for the pivot pins of the stub-axles of motor vehicle steering wheels (5,855—*100,374*)—Daimler-Motoren-Ges.
Railway rail braces (125—*100,429*)—L. A. Mundwiller and H. A. Noedel.
Anti-friction car wheels (1,601—*100,467*)—Chevalier.
Tire-making machines (4,444—*100,209*)—Goodyear Tire and Rubber Company).

Colonial and Foreign Tramways Traffic Returns.

NAME OF COMPANY.	1915. WEEKS ENDED.					1916. WEEKS ENDED.					AGGREGATE.		
	May 29	June 5	June 12	June 19	June 26	May 27	June 3	June 10	June 17	June 24	Wks.	1916.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Anglo-Argentine	53,580	51,984	50,398	50,758	49,296	52,770	50,805	48,644	49,888	48,580	26	1,279,333	− 5,200
Auckland	(28 days)	20,511	...	...	...	(28 days)	21,152	...	...	...	48	253,058	+ 4,949
Burma	4.060	4.087	4.516	4,156	4.224	3,612	3.706	4,155	4,125	3,718	47	—	+ 5.944
Calcutta	62.827	62.871	64.889	62.820	66.574	62.775	62.995	65.311	63,851	66,443	26	1,674,594	+ 85,028
Madras	29,228	(2 weeks)	2.7340	(2 weeks)	...	29.191	(2 weeks)	30.277	(2 weeks)	...	23	341,092	+ 27,437

Companies Issuing Monthly Statements.

	1915. Jan.	Feb.	March.	April.	May.	June.	1916. Jan.	Feb.	March.	April.	May.	June.	Wks.	AGGREGATE. 1916.	+ or −.
	£	£	£	£	£	£	£	£	£	£	£	£		£	£
Brazilian Street Mlrs.	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Brazilian Traction Mlrs	5996190	5797500	6294910	6333460	6670110	...	6430000	6079000	6711000	6678000	7091000	...	22	32,989,000	+1,896,830
Brisbane ...	29.620	34.050	30.740	29.890	...	...	32.280	30.320	34.275	32.575	...	...	18	129.450	+ 12.610
British Columbia	$640.495	558,512	557.135	540.861	...	...	591,949	572.935	577.117	549.046	...	...	43	5,531.193	− 764.709
Buenos Aires Pt. & C.	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Buenos Ayres Lacroze	43.301	38.877	44.332	41.765	44.480	40,421	40,596	39.137	42.219	40.220	41.503	36,213	52	490.818	− 15.324
Cape Town ...	15.660	...	...	...	...	...	16,030	...	14.994	...	...	...	—	—	—
Carthagena & Herrerias	904	1,882	2,436	1,496	1,931	2.059	2.841	1,585	2.991	2,513	2.927	3,512	26	16,369	+ 5,721
Cordoba ...	11.945	11.534	12.746	13,609	...	...	12.329	11.831	13.598	14,053	...	...	4	14,053	+ 444
East India ...	1.914	1.649	1.846	1.864	2.119	2.194	2.015	1.863	2.196	2.116	2.161	2,283	48	23.150	+ 1.597
Kalgoorlie ...	2.372	2.352	2.638	...	...	...	2,236	2.248	2.479	...	...	...	13	6.963	− 399
La Plata ...	4.540	4,016	4.582	4,269	4.489	3,875	4.533	4.346	4.613	4,354	4,343	3,735	26	25,925	+ 160
Lima	33.043	30.164	34.185	31.633	...	...	34.014	32.900	34.159	33.556	...	...	18	134.629	+ 5,614
Manaos ...	...	...	...	...	...	...	...	...	157.156	...	...	...	—	—	—
Manila ...	$ ...	...	119,984	117.450	...	...	...	...	124.750	124,350	...	...	—	505.381	+ 16,765
Melbourne ...	62.729	59,086	...	...	...	...	69.879	69.395	69.542	...	...	...	—	—	—
Mexico ...	$ ...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Monte Video ...	32.459	30.008	29.716	26.786	27.771	24,266	34.252	32.502	31.956	28,997	28.349	25,300	34	241.068	+ 14,376
Port Elizabeth	...	...	...	...	...	...	4.193	3.857	...	...	...	...	—	—	—
Puebla ...	$ ...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Rangoon ...	4.689	4,991	5.217	4,964	4.887	4,997	4.763	4.674	5.501	4.849	4.589	4,205	26	28.581	− 1,164
Toronto ...	$843.351	767.326	820.750	795.816	...	...	906.350	846.256	910.969	883.209	...	...	18	3.546.784	+ 319.541
Winnipeg ...	$350.681	314.658	303.209	264.856	...	...	297.560	293.250	296.500	282,498	...	...	18	1,169.808	− 63.597

(*Continued on page 48*)

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TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1915. WEEKS ENDED.					1916. WEEKS ENDED.					AGGREGATE.		
	May 29	June 5	June 12	June 19	June 26	May 27	June 3	June 10	June 17	June 24	Wks.	1916.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Aberdare	465	362	335	348	331	367	357	351	447	390	12	4,428	+ 246
Aberdeen Corporation	1.763	1.369	2.258	1.866	1.832	1,818	2.088	1.855	1.785	1,840	3	5.680	– 276
Accrington Corporation	594	543	551	559	...	555	565	676	639	...	12	7.001	+ 232
Ayr Corporation	322	336	365	440	407	359	356	380	435	462	6	2.151	+ 45
Bath Electric	*	...	...	...	...	...	...	...	...	...	—	—	—
Birkenhead Corporation	1,526	1.371	1.412	1.401	1.385	1.501	1.465	1.534	1.585	1.598	12½	18.327	+ 1.336
Birmingham Corporation	14.955	12.729	13.202	13.160	13.281	16.601	16.404	15.953	16.984	16,250	12	198.620	+ 35.251
Birmingham Corp. Motor Omnibuses	1.141	819	892	916	898	1.015	989	869	1.050	1.007	12	11.331	+ 1.088
Blackburn Corporation	2.007	1.245	1.294	1.370	1.352	1.404	1.272	1.124	1.567	1.345	12½	16.256	– 497
Blackpool and Fleetwood	1.479	879	623	1.543	681	524	648	545	648	1.025	25	12.530	+ 924
Blackpool Corporation	1.547	2.277	1,116	1.202	1.214	964	1.338	892	2.555	2.293	12	17.459	+ 2,329
Bolton Corporation	2.605	2.818	2.832	2.824	2.741	2.878	2.723	2.795	3.182	2.957	13	35.816	+ 2.433
Bournemouth Corporation	2.005	2.004	2.079	2.009	1.953	2.169	1.945	2.310	2,267	2.216	13	28.280	+ 695
Bradford Corporation	8.639	6.400	6.772	6,524	6,381	6.664	6.515	6,200	7,729	6.725	12	82.850	– 340
Brighton Corporation	1.290	1.030	1.122	1.130	1.121	1.201	1.103	1.143	1.259	1.230	12½	14.054	+ 788
Bristol	13,767	10,246	9,737	9.904	9.802	10.584	10.293	9.558	11,071	10.541	25	238.932	+ 8.855
Burnley Corporation	1.957	1.565	1.543	1.528	1.498	1.680	1.694	1.525	2.057	1.627	13	22.424	– 790
Burton-on-Trent Corporation	314	281	295	282	281	254	266	273	269	264	12	3.179	– 403
Bury Corporation	1.664	1,488	1,394	1.390	1.358	1.445	1.336	1.361	1.815	1.561	13½	18.159	+ 556
Cardiff Corporation	3.250	2.644	2.825	2.776	2.701	2.962	2.852	2.700	3.170	2.931	12	35.162	+ 1.590
Chatham and District	1.473	1.183	1.316	1.243	1.208	1.329	1.294	1,183	1.235	1.334	25	28.213	+ 1163
Chesterfield Corporation	352	255	262	263	264	285	270	257	298	272	12	3.323	+ 120
Colne Corporation	395	241	262	258	234	290	276	243	366	264	—	—	—
Cork Electric	618	536	555	571	559	517	550	508	544	585	25	11.849	– 225
Croydon Corporation	2,252	1,719	1,966	1.980	1,987	...	...	...	...	...	—	—	—
Derby Corporation	1.326	1,017	1.071	1.031	1.046	1.163	1.108	1.065	1.174	1.134	12½	13.698	+ 565
Dover Corporation	360	300	308	301	317	323	325	293	318	318	12	3.740	– 2
Dublin and Lucan	249	187	160	190	183	150	179	154	179	190	25	3.208	– 375
Dublin United	7,472	6,226	6.389	6.643	6,766	6.208	6.508	6.092	6,558	6.890	25	138.398	– 9.806
Dundee City	1.359	1.350	1.385	1.398	1.367	1.393	1.445	1.392	1.369	1.398	5½	7.360	+ 179
East Ham Corporation	1.434	1.200	1.362	1.369	1.356	1.394	1.346	1.298	1.341	1.367	12½	15.967	– 194
Exeter Corporation	498	373	416	394	387	392	385	364	407	396	12	4.534	– 144
Gearless Motor 'Buses	*	...	...	...	...	...	...	...	...	...	—	—	—
Glasgow Corporation	22,819	22,821	22.802	22.930	21,998	24,079	24,328	23,559	24,672	24,389	3½	84.129	+ 6.413
Glasgow Subway	1.035	1.050	1.012	1.008	1.020	1.182	1.120	1.110	1.061	1.054	25	30.043	+ 3.085
Glossop (Urban Elec. Supply Co.)	157	130	136	131	129	143	141	127	158	139	26	3.474	+ 410
Halifax Corporation	3.321	2,060	2.208	2.262	2.288	2.350	2.202	2.102	2.600	2.353	11½	26.379	– 499
Halifax Corp. Motor Omnibuses	77	46	49	46	49	50	49	45	54	49	11½	541	– 65
Hastings and District	1,315	940	957	1.010	1.010	1.049	1.041	923	1,029	1.038	25	21,315	+ 301
Huddersfield Corporation	3.883	2,587	2.768	2.673	2,640	2.920	2.928	2.654	3.718	2.810	12	35,726	+ 2.940
Hull Corporation	3.311	3.001	3.406	2.960	2,920	3.139	3.106	3.074	3.158	3.163	12	37.542	– 773
Ilford U.D. Council	801	643	690	673	675	723	700	645	692	690	12	8.394	+ 430
Ilkeston Corporation	119	135	132	138	135	140	130	141	134	140	13	1.743	+ 66
Ipswich Corporation	680	539	588	571	607	568	608	548	599	601	12	6.366	+ 233
Isle of Thanet	588	413	414	408	432	348	337	309	355	366	38	10.471	– 1.955
Kilmarnock Corporation	159	169	165	173	176	161	161	161	170	188	5½	964	– 50
Lanarkshire	2,093	1,945	2.093	2.105	2.109	2,371	2.336	2.310	2.357	2,574	25	54,969	+ 8.807
Lancashire United	2,102	2.115	1.777	1.892	1.830	1.942	1.819	1.652	1.892	2.111	25	42.493	+ 1.539
Leeds City	11.651	8,808	9.383	9.188	8.875	9.914	9.651	9.169	10.481	9.832	13	118.415	+ 8.975
Leicester Corporation	*	...	...	...	...	...	...	...	...	...	—	—	—
Leith Corporation	798	787	815	791	795	876	843	843	862	882	5½	4.934	+ 369
Leyton U.D. Council	1,846	1,324	1.625	1.635	1.683	1.764	1.724	1.554	1.618	1.749	12	19.590	– 33
Liverpool Corporation	15.371	13,562	13.929	13.934	13.776	14.471	14.296	13.645	14,792	14,468	25½	341.788	+ 14.924
Llandudno and Colwyn Bay	541	392	358	390	267	307	323	339	571	448	29½	7.438	– 367
London County Council	12.610	23.586	41.087	44,012	44,897	...	...	47,603	47.611	48,867	11½	558.906	+ 86.588
London General Omnibus	*	...	...	...	...	...	...	...	...	...	—	—	—
London United	*	...	...	...	...	...	...	...	...	...	—	—	—
Lowestoft Corporation	213	170	188	...	...	139	140	132	...	...	35½	4,642	– 1.379
Maidstone Corporation	275	196	212	203	204	210	206	192	194	203	12	2.568	– 76
Manchester Corporation	21.197	18.493	18.348	18.405	18.317	19.094	18.886	17.617	20.852	19.339	12	228.607	+ 8.704
Metropolitan Electric Tramways	*	...	...	...	...	...	...	...	...	...	—	—	—
National Steam Car	*	...	...	...	...	...	...	...	...	...	—	—	—
Nelson Corporation	280	174	197	185	177	210	220	180	252	203	12½	2,665	+ 257
Newcastle-on-Tyne Corporation	6,531	6,269	6.451	6.546	6.564	6.548	6.698	6.487	6.663	6.824	12	77,346	+ 1.856
Newport (Mon.) Corporation	1,043	803	870	852	843	924	892	897	992	897	12	11.104	+ 672
New St. Helens and District	1.578	1,054	1,018	1.129	1.069	1.094	1.005	892	1.139	1.126	51	50.896	+ 2.774
Northampton Corporation	1.074	734	787	774	779	712	700	640	755	665	12	8.332	– 1.007
Nottingham Corporation	4.473	3,495	3,768	3.718	3,783	3.946	3,852	3,663	3,924	3,896	12	45.469	+ 1.115
Oldham Corporation	2.712	2,428	2.323	2.402	2,338	2.513	2,302	2.447	2,908	2.591	13	33.280	+ 1.793
Portsmouth Corporation	3.177	2.548	2.631	2.679	2,707	2.850	2.802	2.472	2.757	2.727	13	32.631	—
Preston Corporation	1.249	888	932	939	943	1.144	1.069	1,032	1.340	1.037	11½	12.771	+ 1.353
Provincial	2.957	2.302	2.375	2.438	2.461	2.509	2.441	2.182	2.507	2.468	38	81.812	+ 4.151
Reading Corporation	978	733	802	817	811	841	837	761	827	826	11½	9.623	+ 359
Rhondda Tramways	1,506	1,263	1.160	1.218	...	1,282	1.233	1.192	1,557	...	24	29.033	+ 1.476
Rochdale Corporation	2,255	1.897	1.706	1.772	1,677	1.806	1.753	1,609	2.202	1.924	12½	22.456	+ 561
Rotherham Corporation	1.126	1.147	1.143	1.139	1.126	1.416	1.392	1.571	1.539	1.573	12½	18.275	+ 4.012
Salford Corporation	6,306	5.205	5.439	5,402	5,398	5.569	5.311	5.374	6,416	5,575	12½	68.504	+ 2.908
Sheffield Corporation	9.678	8.648	8,824	8.767	8.680	10,573	10,133	10,226	10.981	10.685	13½	134.806	+ 22.120
Southampton Corporation	1.800	1.414	1.477	1.526	1.479	1.672	1.638	1.503	1.629	1.712	11½	18.446	+ 1.049
Southend-on-Sea Corporation	1,134	754	750	737	728	839	836	797	873	849	12	9.321	– 469
South Metropolitan Tramways	*	...	...	...	...	...	...	...	...	...	—	—	—
South Shields Corporation	931	766	799	888	884	807	818	783	809	819	12½	9.662	+ 122
Sunderland Corporation	1.678	1.429	1.558	1.501	1.504	1.575	1.563	1.563	1.607	1.618	12	19.130	+ 697
Sunderland District	870	528	543	578	588	664	611	592	650	606	34	19.655	+ 4.025
Swindon Corporation	241	197	206	214	206	221	204	182	207	206	11½	2.335	+ 7
Torquay Tramways	759	581	535	554	557	609	565	511	655	597	25	12.236	+ 23
Tramways (M.E.T.) Omnibus Co.	*	...	...	...	...	...	...	...	...	...	—	—	—
Tyneside Tramways and Tramroads	878	610	659	808	...	699	624	602	620	...	—	—	—
Wallasey Corporation	1.668	1.271	1.323	1.347	1.283	1.322	1.285	1.236	1.512	1.417	12½	16.131	+ 324
Walsall Corporation	1.028	692	742	756	765	819	800	796	954	798	26	20.120	+ 2.381
Walthamstow U.D. Council	1.259	893	993	1.025	1.037	1.193	1.152	926	1.049	1.106	12	12.915	+ 1.608
Warrington Corporation	492	455	458	461	448	482	478	466	491	474	12	5.700	+ 417
West Ham Corporation	3,483	2,837	3,205	3.212	3,183	3,436	3.403	3.176	3.228	3.306	11½	38.664	+ 1,563
Wigan Corporation	1.822	1,492	1.473	1.546	1.521	1.686	1,617	1.703	1.790	1,654	12	19.832	+ 1.203
Wolverhampton Corporation	1.022	1.075	1.076	1.085	1.089	1.178	1.128	1.382	1.196	1.198	13	15.478	+ 1.388
Yorkshire (West Riding)	2.372	1.643	1.602	1 605	1.567	1.729	1.631	1.761	2.058	1.718	26	43 749	+ 3.747

* TRAFFIC RETURNS SUSPENDED.

Owing to the European war, the Government have taken over the railways of Great Britain as from August 4, 1914, and the issue of traffic returns has been suspended. Consequently the traffic returns of the electric railways which usually appear on this page cannot be given.

The Publication of the Traffic Returns of the Tramways marked with an asterisk in the above table have also been suspended during the war.

TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officals and the principal particulars relating to each undertaking.

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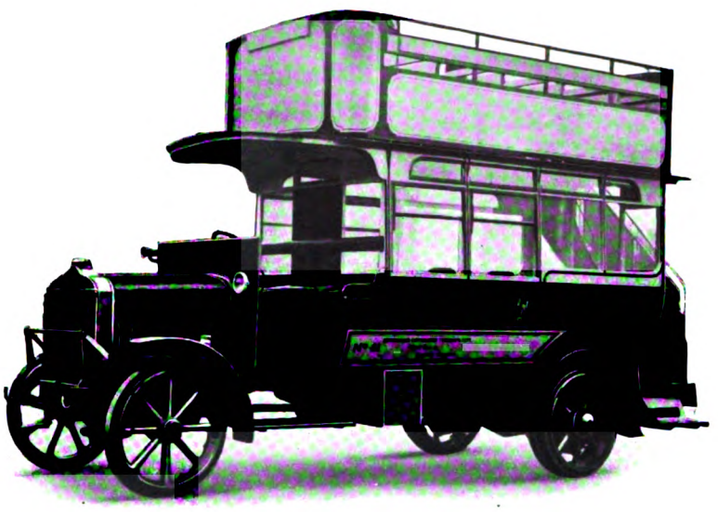

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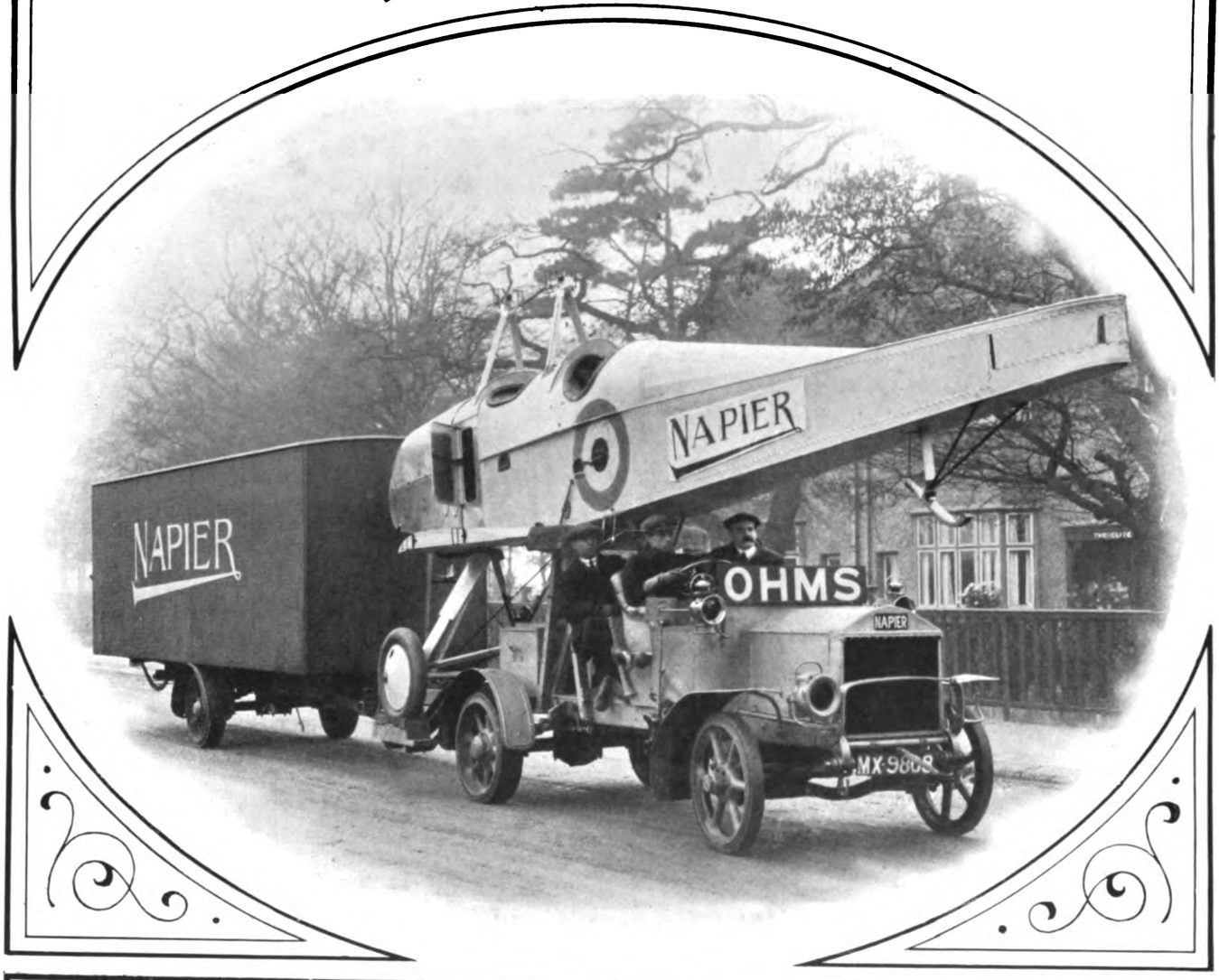

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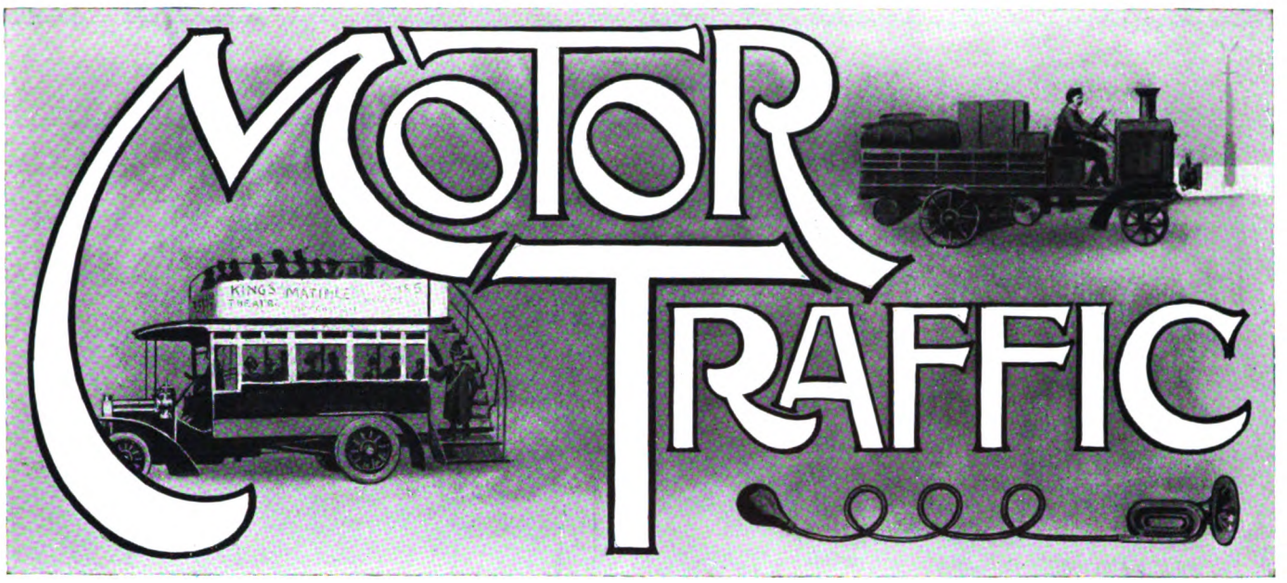

The past few weeks has been a period of no little uncertainty for all who have to deal with motor transport. The question of petrol supplies has loomed very largely, and is still somewhat crucial. In the course of a very few days during last month, owners of utility motors had a particularly trying time. They started in the first place with the position created by the Budget, which, with its new scale of license duties, left the commercial car on exactly the same footing as before. The next development was the petrol census, and the classification scheme, whereby motor users were divided into three broad classes, with various categories under each, and an order of priority as regards available fuel supplies laid down. The scheme cannot be described as entirely satisfactory, but possibly it was defensible as a rough-and-ready method of meeting an emergency, which, by the way, is not even now certain to arise. This classification was still being actively discussed, when there arose another development that relegated it forthwith to the background. Yielding to the many and bitter protests occasioned by the proposed revised scale of license duties—applied, of course, only to private cars—the Chancellor of the Exchequer suddenly announced its abandonment, and the substitution of a species of super-tax on petrol, which would bring something to the revenue and restrict consumption of the precious spirit, thus achieving a double purpose. But, whereas no part of the proposed new license duties would have fallen upon trade or utility vehicles, under the new plan, as first put forward, they had to take their share of the extra petrol tax—on private cars it was to be 6d. per gallon, and on commercial cars half that figure. Motor trading concerns were, naturally, taken aback, but before the storm of protest had time to assert itself, there was another *volte face*, and within about forty-eight hours of the announcement of the new petrol tax it was decided not to impose it at all on spirit to be used in commercial vehicles. The Government, however, was said to have "made up its mind" to insist upon the rationing scheme, which, rumour says, it may never be necessary to enforce. Thus, those who own and run motor vehicles "for purpose of trade or husbandry, etc.," were able to breathe freely once more, and to go about their business in the hope that the energies in this direction of the Treasury, or whoever else may be responsible, are exhausted.

* * * * * *

One more event, however, in a truly eventful month. A decision—which many consider should have been taken long ago—to prohibit the import of foreign-made commercial vehicles was published on June 27. The terms permit of the entry of what may conveniently be called "spares," but not of parts for assembling purposes, and in addition there is a proviso to the effect that the prohibition may be modified in special cases, if it appears desirable in the national interests. This proviso, it must be remarked, is somewhat vague, and it leaves the way open for unpleasant incidents of a character upon which it is not necessary to dwell. Presumably, it will be construed so that, for instance, a municipality requiring road sweepers or vehicles of similarly essential character, and being unable to obtain them from any British maker, would be able to import them. These cases, however, are likely to be exceptional. The difficulties of Corporations and Councils in regard to vehicles are assuming quite another and more critical form.

* * * * * *

The supply of drivers for motor vehicles is becoming not only restricted, but seriously inadequate. Public authorities in the London area are having the utmost difficulty in maintaining the services in which motor transport figures at even the barest minimum of sufficiency. One of them has a considerable proportion of its fleet of steam wagons lying idle, simply because there are no drivers to be had, and in varying degree this condition is being reproduced elsewhere. The problem can be met, it is true, to some extent by cutting down every service to the last degree. Dust collections can, at a pinch, be confined to once in ten days instead of once a week, or possibly the interval can be stretched to a full fortnight. Minor streets can be left unwatered, only the most important being dealt with. Internal organisation and co-operation between adjoining areas can effect general economies in time, labour, and vehicle mileage, but the driver question remains. There is, of course, a limit beyond which these measures cannot possibly be carried without dire risks to the public health, and in the opinion of many more than competent to judge that limit has already been over-reached. What the Government recognises in connection with petrol supplies—the need of absolute priority for public health services over most others—must be realised by the community in general. Before laying-up vehicles that in the ordinary course should be, and would be, at work, even with measures of economy in force, an authority should certainly exhaust all possible resources before coming to the conclusion that it cannot find drivers. What is there to be said

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MOTOR TRAFFIC.

against the use of volunteers? To drive a dust cart, for instance, might not be a very attractive form of service, but there are motorists who would do it, in an emergency, if asked, and it is not less patriotic than driving an ambulance. There is no record of any efforts being made to this end, but the precedent of labour troubles in the past, in which men of the professional classes have kept a town's gas supply going by acting as stokers, is apposite and helpful. Where there are steam wagons, engine drivers either locomotive or stationary might easily be coached, and afterwards utilised to carry things on. It should not be impossible to arrange matters on a spare-time basis. Once an appeal for assistance of this kind were made and a list of names obtained, some sort of rota could be devised, and the services arranged accordingly. The drawbacks of having to carry out municipal work on such lines as these, of course, are obvious enough, but they are preferable to not carrying them on at all.

* * * * * *

In a recent issue we made a brief reference to the satisfactory results obtained by the motor omnibus services of the Eastbourne Corporation and the Sheffield Corporation Tramways Department. The former have now issued the accounts relating to the working of their motor omnibuses during the year ended March 31 last. Notwithstanding the difficulties that have to be encountered at such a period as the present, there remains a net profit of nearly £4,000. Besides the financial side of the question, there are other considerations of equal importance in the interests of the future of omnibus development. It may therefore be worth while to consider briefly the comparative advantages of municipal and private ownership of local public motor services. For purposes of comparison with Eastbourne, one might instance the neighbouring town of Brighton. Here, the untrammelled development of the motor omnibus has been made impossible as a result of local political influences, this in turn resulting from the fact that the omnibus services in the past have been owned by a company and not by the Corporation. The organisation and management have been good, but the mere fact that any profits accruing have not found their way into the pockets of the ratepayers has brought trouble. The Corporation have been anxious to dispose of electrical power to advantage. They have therefore leant strongly towards the use of some form of electrical traction. Electric omnibuses have been tried, and there has been much talk about the use of trackless trolley cars, as well as about possible extensions of tramway lines. We have here, in fact, an instance of a comparative disadvantage of private ownership due to no fault on the part of the owners. In other districts other disadvantages make themselves felt.

* * * * * *

Returning for a moment to Eastbourne, we find the motor omnibus services admirably controlled by a public official, who exercises constant supervision in order to secure exact punctuality and perfect interconnection of the omnibuses plying on the various routes. Many little things are done for the comfort and convenience of the public. At certain stopping points shelters are erected, and at all such points there are clock faces indicating the time at which the next omnibus will arrive. The whole organisation is perfectly dependable. If a certain omnibus is due to reach the railway station at a certain time, it is perfectly safe to assume that it will do so, and that there is no risk of missing a train with which it ought to connect. In many localities local services are in the hands of private owners, who originally started out only with the operation of chars-a-bancs engaged in country trips. In some such instances the organisation reveals certain faults from the point of view of the public. The services which are supposed to connect with one another only do so in a haphazard way, resulting in frequent delays, overcrowding of vehicles, and uncertainty as to the time of arrival at the destination of the passengers. Particularly at those times when the work of the vehicles is very heavy, proprietors are inclined to place the possibilities of high profit before the interests of their patrons, and in so doing to indulge in a state of comparative chaos, contriving, perhaps, to deal with the maximum number of passengers, but to do it in such a way as to cause a great deal of annoyance and inconvenience. Even those who are firmly of the opinion that private enterprise may be expected to gain better economical results than municipal ownership, cannot fail to appreciate the importance of this side of the question. The ordinary chars-a-banc or coach trip is certainly a matter for private local enterprise, but if regular services are entrusted to the same management, regulations ought to be devised and enforced prescribing the frequency of the services. Some payment should be made to the local authorities in return for the monopoly or share of the business, and fines or termination of agreements should result from anything in the nature of frequent failure to maintain punctual and satisfactory services.

WAR LEGISLATION.

Prohibition of Commercial Motor Imports.

The Board of Trade direct attention to a Proclamation, published in the *London Gazette* of June 27, by virtue of which the importation of commercial motor cars and chassis, accessories, and parts of such cars (other than tires) is prohibited as from July 6. Licenses to import will be granted in cases where the goods were either en route for the United Kingdom or actually paid for at the date of the Proclamation. Licenses will also be given where it can be shown that the importation is desirable in the national interests, or where the motor car (being a commercial car) is urgently required for any of the purposes specified in Class A of the order of priority for the distribution of motor spirit (see p. 402, Tramway and Railway World, June 8), or for agricultural purposes, or for the conveyance of essential goods. Licenses will further be issued for the importation of spare parts for imported commercial vehicles which are already in the United Kingdom.

GOVERNMENT PURCHASES OF LONDON OMNIBUSES.

Dr. Macnamara (Secretary to the Admiralty), replying in the House of Commons on June 22 to Mr. Ashley, said that the sum already paid by the Admiralty to the London General Omnibus Company since the outbreak of war was £46,460. Thirty omnibuses were purchased at a price which was estimated at £27,270, this amount being included in a larger sum which covered hire and so on for a certain period before purchase. No chassis had been purchased separately. As to what sum was still owing, the outstanding liabilities were estimated at about £3,000, but claims had not yet been received for the greater part of the items.

In reply to a further question by Mr. Ashley, the Financial Secretary to the War Office said that since the outbreak of war the approximate payments made to the London General Omnibus Company to date had amounted to £750,000, of which £714,000 represented the cost of motor vehicles, bodies, spare parts, etc. Accounts awaiting payment amounted to £15,000.

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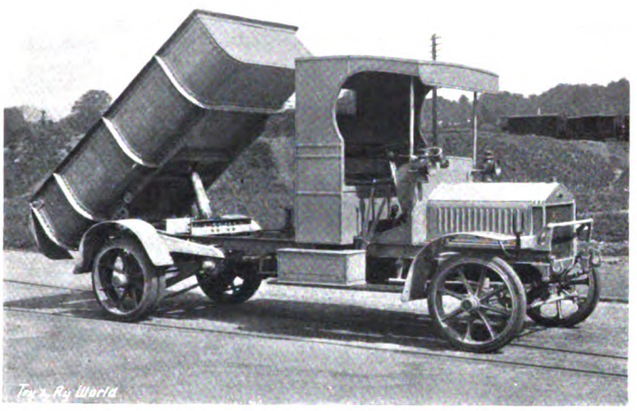
MOTOR TRAFFIC.

ALBION TIPPING WAGON IN BELFAST.

The photograph on this page depicts a 32 H.P. Albion 3-ton hydraulic tipping wagon recently delivered from the Albion Works, Glasgow, under special release permit from the War Department, to the Belfast Harbour Commissioners. The Albion hydraulic tipper since its introduction in the market some time ago has met with every success. It is primarily intended for heavy loads of three and four tons, for which the ordinary type of hand-operated mechanism presents many difficulties.



Hydraulic Tip of the Albion Wagon.

The Albion hydraulic tipping gear uses a medium light machinery oil, which is forced by means of a pump situated underneath the driver's seat on the left-hand side of the chassis, directly to the rear of the gear box. The cylinder of this ram is carried on trunnion brackets fixed to strong steel cross channels. The trunnions allow ram and cylinder to accommodate themselves to the inclination of the body while tipping. The oil is introduced into the cylinder through the centre of the near-side trunnion. The hydraulic pump is driven by means of a worm and worm wheel from the propeller shaft of the vehicle. This gear is entirely enclosed and runs in an oil bath. The pump is brought into operation by means of a hand lever placed at the left-hand side of the driver's seat, which connects the worm shaft of the pump with the propeller shaft of the vehicle through the medium of dog clutches.

A regulator valve is fitted to the system, and is situated at the driver's left-hand side. It is so arranged that when the valve is open the pump forces the oil back to the reservoir. To bring the tipping ram into operation the regulating valve is closed down and the oil is thus forced direct to the cylinder. Hence by means of this regulator valve, the body is not necessarily being tipped although the pump may be running. A safety valve is fitted to the pipe between the pump and the tipping cylinder, so that no harm is done to the installation when the ram is forced up to the top of the cylinder, the pressure escaping by means of the safety valve.

To lower the body the regulator valve is opened, when the weight of the body acting on the ram forces the oil back from the tipping cylinder to the reservoir. The load can be completely tipped in about one and a quarter minutes, the body returning to its horizontal position in about three-quarters of a minute. The body is built of strong steel plates, rigidly braced and strengthened. The tail-board is hinged at the top with special clips, which are automatically freed after the body has been slightly raised, and the clips automatically fasten the tailboard when the body is lowered.

SEATS FOR OMNIBUS CONDUCTORS.

The London General Omnibus Company announce that the Chief Commissioner for Police has sanctioned the fitting of seats for conductors on the London motor omnibuses. The seats, which will be fitted on the back platform of the omnibuses, will be of neat design and so constructed as to fold up when not in use. It is hoped that in a very short time every London General omnibus will be equipped with one of the new seats, which will add to the comfort and well-being of the large numbers of women conductors who are filling the places of male conductors now on war service.

At the meeting of the London County Council on July 4, Mr. G. H. Hume, Chairman of the Tramways Committee, in reply to a question said that the Committee proposed to make similar provision on the tramway cars.

NAPIER VANS IN RAILWAY WORK.

An interesting photograph is appended of a Napier 3½ ton business vehicle, taken alongside one of the latest type of the Great Central Railway engines, which is named after the late lamented Earl Kitchener of Khartoum. This magnificent engine is a 4-6-0 tender engine designed by Mr. John G. Robinson, chief mechanical engineer of the Great Central Railway, and was built in 1914 in the company's workshops at Gorton. The cylinders are 21½ in. diameter by 26 in. stroke, and fitted with the Robinson superheater, piston valves, and pressure release valves. One of the chief objects of both rail and road transport is the saving of fuel, and Mr. Robinson's superheater has undoubtedly gone a long way in this direction.

Napier 3½-Ton Van alongside a Great Central Locomotive.

It is often assumed that the keenest competition exists between the railways and motor transporters, but it is now well known that the two services work in friendly alliance, the business vehicles being used to feed the railways and for delivery of goods. Napier business motor lorries have been engaged on this class of work for some time, and they are spoken of very highly for their efficiency and reliability, by the great carrying companies, in communications that reach the company's head office at 14, New Burlington Street, London, W.

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MOTOR TRAFFIC.

THE EDISON BATTERY.

ITS CONSTRUCTION AND WORKING.

The great prominence that is being given to the subject of electric accumulator traction by the Electric Vehicle Committee of the Incorporated Municipal Electrical Association must result in an increasing number of people, especially of those concerned in municipal enterprise, turning their attention to the battery-driven automobile. The crux of this subject is the battery. The electric motor, the controller, the transmission gear, the wheels, and the body of the vehicle can all be readily provided; the requirements are known and the methods of meeting them are equally well known. In past times it has been the battery that has made shipwreck of many promising schemes. The batteries could do the work required, but the cost of maintenance was so high that the electric vehicle was found to be impracticable, especially in the rough-and-ready work required in public service. Those were the days of the comparatively unimproved lead battery—a collection of lead plates treated with oxides and immersed in a bath of sulphuric acid and water. Within recent years, however, the lead battery has been very much improved, chiefly in America, by alterations in mechanical details, so that it is now much stronger and is better able to withstand the severe stresses associated with traction work. The cost of maintenance, once prohibitive, has been so reduced that the lead cell is quite a commercial proposition, and it is now largely and increasingly used in America for commercial vehicles. Its favourable features are moderate first cost and high electrical efficiency (the ratio of output to input being 70 or 75 per cent.). Against it are its great weight, its very moderate length of life, and the great care and numerous precautions which have to be observed in dealing with it if damage is to be avoided.

The lead battery in various types has been well known for many years. We here propose to give a general description of the Edison nickel-iron battery, which is a comparatively recent introduction in this country, and from which great things, if we may judge from experience already obtained, may be expected. Though this battery has been described in papers read before technical societies from time to time, it is only now that general attention is being directed to it. The purpose here is to set out its main points of construction and characteristics, as well as to attempt an outline in plain language of the theory of its action.

As a preliminary, and by way of comparison with the points of the lead battery noted above, it may be said that the nickel-iron cell is comparatively light, that it has an enormously long life, and that the cost of maintenance is very low. On the other hand, its first cost is higher than that of a corresponding lead battery, and its efficiency is lower, ranging from 50 to 60 per cent. The latter disadvantage is becoming of less importance as the cost of electricity for charging goes down.

THE MECHANICAL CONSTRUCTION.

It is many years since Edison began his researches on other combinations than lead and sulphuric acid, and in 1901 he produced a cell which was the forerunner of the present one. The latter dates from 1908, and in America, and more recently in this country, it has proved of great excellence for traction work. As in all other electric accumulators, what is called the storage action is really a transformation of electrical energy (provided by the charging current) into chemical activity, which on reversal produces an electric current. In each cell there are the positive and negative plates suitably insulated and mounted and immersed in a conducting liquid called the electrolyte. Metallic bridges connect all positives and negatives respectively together, and form the seating for terminal posts to which are attached the wires for charging and discharging. When cells are in series the positives of the first are connected with the negatives of the second, and so on.

Fig. 1.

Fig. 2.

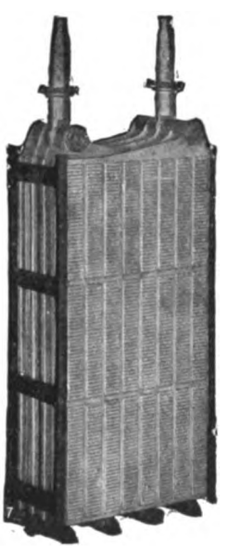

Fig. 3.

Fig. 4.

Fig. 5.

THE POSITIVE PLATE.

In addition to great mechanical strength, one of the fundamental advantages of the nickel-iron cell is that it is impossible to dislodge active material from the positive plate. This plate (Fig. 1) is built up of a series of finely perforated nickel-steel tubes. Each tube is made from a thin strip of steel coiled round in a spiral of a quarter of an inch diameter. The edges are lapped over to prevent re-opening, and the tube is further strengthened by eight steel bands encircling it at equal distances apart. Each tube (Fig. 2) is filled with hundreds of fine alternate layers of green nickel oxide and thin flake metallic nickel, the whole being rammed down tightly. The function of the metallic nickel flakes is purely one of conducting, as it is necessary to improve the rather poor conductance of nickel oxide. A complete positive element is composed of two rows one above the other, each of 15 tubes, assembled in a stamped frame of nickel steel, as shown in Fig. 1. This unit has a capacity of about 40 ampere-hours.

THE NEGATIVE PLATE.

The negative plate (shown mounted in Fig. 3) is built up of rectangular pockets made of very thin nickel-steel strip finely perforated. These pockets are assembled in a light steel retaining case. Each pocket (Fig. 4) is filled with finely divided iron oxide with which is incorporated a small proportion of mercury for the purpose of reducing specific resistance. The pocket is subjected to heavy die pressure which internally consolidates the active substance, and corrugates the face of the pockets, thus making them elastic yet rigid. By means of the die pressure also the edges of the pockets are swaged over so as to associate them effectively and permanently with the steel frame. It is thus impossible for vibration or shock to impair either conductivity or mechanical unity.

The plates are grouped alternately, insulated from each other by fine ebonite strips, in a welded steel case (Fig. 5). Metallic contact between the plates and the case is prevented by ebonite strips. The terminal posts are insulated by means of stuffing-box glands mounted in the welded-in top of the container. The gland is made of compressed paper with a soft rubber ring on the top. The cover of the cell is fitted with a gravity valve to allow of filling up with the electrolyte or with water. The valve is incorporated in a snap lid. When complete, the cell is watertight and airtight, except that the valve allows the escape of gas though it prevents the entrance of air.

The electrolyte, forming the bath for the plates, consists of a 21 per cent. solution of potassium hydrate (containing also lithium hydrate) in distilled water. It has been proved, apart from its effectiveness otherwise, that this solution has a preservative action on steel, and thus terminal corrosion is impossible. The whole construction is shown diagramatically in Fig. 6.

The complete cell is so designed that it is impossible for any internal movement or bumping to take place. This, of course, is of great importance in traction work. For this reason, and because

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of its great strength, the cell is practically immune from the effects of mechanical abuse. No buckling of plates nor shedding of active material can occur, and neither is any injury caused by severe overcharging or discharging, whether as to duration or degree. Prolonged shaking and bumping tests have failed to show any deterioration either mechanically or electrically. The absence of sulphuric acid also means the elimination of disagreeable fumes.

In regard to the mounting of the cells in crates, as the containers are metallic it is necessary to prevent adjacent cells from coming into contact. Accordingly each cell is mounted in a steel cradle supported by a strong crate made of hardwood. A large battery can thus be handled in easily liftable sections.

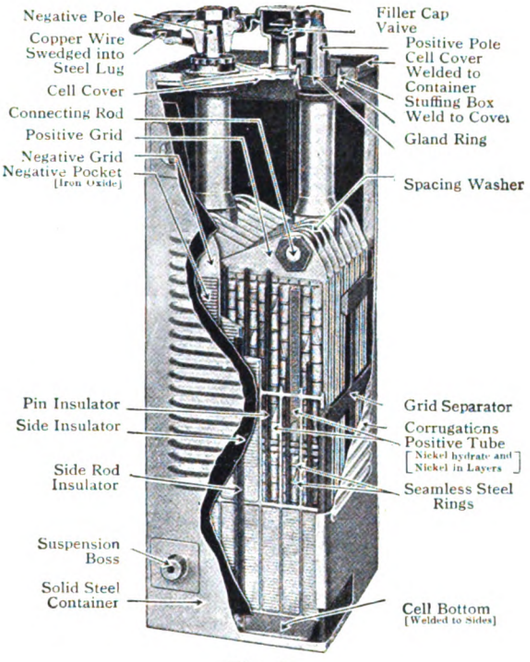

Fig. 6.

ADVANTAGES.

The battery is guaranteed to show an undiminished output at the end of four years' all-day service in traction work. The makers in fact consider that it is difficult to assign a probable duration to the life of the cell, as the results of artificial ageing tests indicate a minimum period of ten years' all-day service without any renewals or repairs being necessary. In use the battery slowly appreciates in output, and it has been found that a battery rated at 150 ampere-hours gives 180 ampere-hours in everyday service.

The following are among the advantages put forward for the Edison battery, in addition to those already dealt with :—

It may be discharged at any rate or even short-circuited many times without injury.

It is improved by occasional overcharging ; in emergency an overcharge will give an extra output of nearly 30 per cent.

It may be charged only once a year or it may be left idle in any state of charge or discharge for any time without resultant deterioration.

It is not injured by high-rate charging. In emergency it may be charged fully from total exhaustion in three hours. It may also be boosted at five times the normal rate for half an hour. This proves of great value where there is a demand for a vehicle to continue running for some time after the battery has become exhausted. A short intense boost will give the power required for the remaining distance instead of the battery having to go to the depot for a full charge extending over several hours.

The specific gravity of the electrolyte needs no attention ; it does not alter.

The electrolyte needs renewing at only long intervals ; at other times merely a little distilled water has to be added.

These advantages will be specially appreciated by those who have had experience of lead batteries, particularly of older types.

Any engineer who examines the construction of the plates and cells will at once be impressed with their remarkable perfection as a mechanical job. The process of manufacture seems perfect, though obviously it must be complicated, and even with special machinery expensive. Strength, compactness, lightness, and perfect fitting are clearly manifest. It is interesting also to note the perforations both in the positive tubes and in the negative pockets. They are innumerable, but so small that good eyes and a good light are necessary for seeing them.

By way of some set-off against the advantages, the lower efficiency of the cell as compared with one of lead (already referred to) is sometimes pointed out. It is also noted that the saving in weight is not so great as at first apparent, because the electric pressure per Edison cell is only 1·2 volts, or not much more than half that obtainable from the lead cell. Therefore for any given voltage required more cells must be used. The advantage in weight still lies, however, with the nickel-iron combination.

Space does not permit of details being given of the electric characteristics of the battery ; tables and graphic curves will be supplied by the makers to all inquirers. It may, however, here be noted that the ampere-hour output per cell varies according to size from 42 to 504 on a seven-hours charge, and that the watt-hour output is from 50 to 605. The output per pound weight of cell is from 11 to 14·8 watt-hours. The internal resistance is from ·012 to ·001 ohm, and the watt-hour efficiency is from 55 to 60 per cent. The volume of the cell is about ·85 cubic ft. per kilowatt-hour of available output, corresponding to a weight of 75 lb.

THE ELECTROLYTIC ACTION.

We now come to the part of the subject which is more difficult but in which those who like to get at fundamentals must take a special interest. That is the question of the electrolytic action of the battery ; what is it that goes on in its interior during charging and discharging—what are the chemical reactions ? The further question how electric energy changes into chemical reactions and *vice versa* must remain unanswered. Many descriptions of the battery fight shy of the whole of this subject, but an attempt is here made to indicate the theory.

In regard to the chemical changes, though a good deal is known much remains uncertain and some things remain mysterious. This is not surprising when one bears in mind that the theory of the lead battery, which has been studied for so many years by electrochemists, is still abstruse and puzzling. By way of a rough engineering approximation it may be said that the action in the nickel-iron cell during discharge is a transference of oxygen to the iron plate, which therefore becomes reoxidised, the nickel plate being meanwhile reduced by the hydrogen from the electrolyte. This statement may be elaborated as under, but even so it is only an indication of a series of complicated reactions.

To any reader unversed in the necessary chemistry, a few explanations may here be useful. Thus, a hydrate—so frequently referred to—is a compound formed of some substance with a hydrate molecule. This molecule consists of one atom of oxygen and one of hydrogen. For example, potassium hydrate—the substance dissolved in water which forms the electrolyte in the battery—has a proportion of one atom of potassium and one molecule of hydrate (OH), and having the formula KOH. Hydrated iron oxide has a molecule of black iron oxide (Fe_3O_4) combined with hydrate molecules, the exact proportion of which is uncertain and they are accordingly expressed by $(OH)n$. As water consists of two of hydrogen to one of oxygen (H_2O), hydrate is formed by the replacement of one of the atoms of hydrogen by its equivalent of the substance hydrated.

Considering now the cell during charging, we have one plate containing a low oxide of nickel in a hydrated condition. This is the anode or current-entering plate. The other plate contains hydrated iron oxide, probably of a formula analogous to $Fe_3O_4(OH)n$. During the passage of the current from one plate to the other through the electrolyte, two principal reactions are proceeding. The electrolytic dissociation of the water causes its oxygen atoms to flow against the current, and they attack the nickel oxide and cause it to assume a higher state of oxidation. The hydrogen atoms from the water flow with the current and attack the iron plate, thus reducing the iron oxide gradually to a state of chemically pure iron. This occurs because the nascent hydrogen evolved by the electrolysis of the water absorbs the oxygen from the iron oxide, thus producing water afresh. When the two processes are about complete, the cell is said to be in a charged condition.

The first charge of an Edison cell is different from all succeeding charges, so far as the nickel plate is concerned. In the new nickel plate the active material is a green nickel oxide, and this substance becomes permanently oxidised up, even after discharge, as compared with its initial state.

On discharge of the cell, an action which is almost the exact opposite of that already described occurs. Current is now flowing from the iron plate towards the nickel plate, hydrogen being carried

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in that direction and attacking the extra oxygen atoms which the charging process had carried over to the nickel plate, while the oxygen travelling against the current—slowly oxidises the iron plate until this plate becomes almost completely oxidised. Meanwhile the nickel plate has become reduced not to the state represented by green nickel oxide, but probably to a state one degree higher. This chemical process proceeds till completed, when the discharging electric current ceases to flow and the cell is said to be discharged.

There is a secondary reaction occasioned by the splitting up of the potassium hydrate molecules of the electrolyte. The potassium atoms tend to travel with the current, and the oxygen and hydrogen atoms against the current. This tendency, however, is practically neutralised in effect by secondary reactions which occur between the potassium and the water, and the OH group and the hydrogen, at the negative or positive plate, as the case may be.

The main process accordingly, both in charging and discharging, is a transfer of oxygen backward and forward between the plates. The electrolyte acts as a liquid conductor and itself remains unimpaired. Its specific gravity changes only slightly and never to an extent which entails readings of its value being taken.

In regard to the watt-hour efficiency of the cell, put by the makers at about 60 per cent., part of the loss occurs during charging, and this is attributable to a heat effect due to the internal resistance of the cell. The rest of the loss is explained by a sort of chemical inertia in the active material which manifests what may be called an endothermic reaction—that is a heat (energy) absorbing condition.

With regard to the use of potassium hydrate in the electrolyte, it, of course, reduces the electric resistance of the water, though other substances also would have a similar effect. As already noted, potassium hydrate has also a preservative action on steel. It is, further, probable that the secondary reactions caused by the potassium hydrate (alluded to above) and possibly other reactions of an obscure nature are of value in producing the total result. In any event, the use of KOH is the outcome of innumerable experiments and represents the final conclusion reached from them.

STANDARDISED VEHICLES FOR TRADERS.

Dennis Brothers, Limited, of Guildford, recently delivered to the Failsworth Industrial Society one of the War Department type of lorry, of which they have supplied so large a number to the War Office, and to private firms under the release arrangement. Unless the service requirements are very exceptional in character, there

Dennis War Department Lorry.

is considerable advantage in purchasing a standardised lorry, as so many traders have lately been doing, inasmuch as by so doing they secure a vehicle in the design of which every detail has been thought out with the utmost care with a view to obtaining the maximum of reliability and life in operation.

LONDON MOTOR AMBULANCE SERVICE.—The number of calls received at motor ambulance stations of the London County Council during June was 597. No less than 590 injured persons were conveyed to hospital. Sixty-four accidents were caused by vans, 41 by motor cars, 48 by motor and pedal cycles, 27 by motor omnibuses, 27 by tramcars, and 12 by taxi-cabs.

FRONT ENTRANCE OMNIBUS.

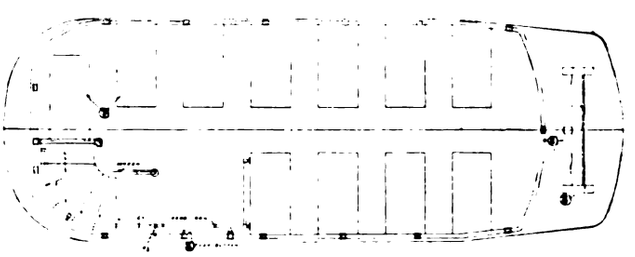
A BRILL NOVELTY IN AMERICA.

For one-man operation in the United States the use of the front entrance and exit on single-deck omnibuses is universal. Now the J. G. Brill Company, of Philadelphia and 110, Cannon Street, London, E.C., have introduced a near side double-deck conveyance for operation entirely by the driver. An illustration of the vehicle is given on this page.

Ordinarily a 40 passenger omnibus would be beyond the power of one man to drive, collect fares, and see that the passengers alight safely, but with the arrangements devised by the Brill Company it is stated that such a vehicle can be handled with comparative ease. The entrance and exit doors are of the two-leaf folding type, and are operated separately or simultaneously by a mechanism located in front of the driver. The doors work in conjunction with double folding steps, and are panelled their full length with narrow lights of wire glass. These panels, together with the wide front and side windows, allow the driver a clear three-way view.

Brill Front Entrance Omnibus.

When the omnibus is at a standstill, the driver can devote his entire attention to the movements of the passengers and the collection of fares. Incoming and outgoing passengers are separated by an iron pipe railing. The driver's seat is in the forward left-hand corner, and to the rear of this is a short longitudinal seat. The remainder of the seating space on the lower deck is taken up by eight Brill stationary-back transverse seats, upholstered in woven rattan, except the driver's seat, which is covered with leather. Windows are arranged five on the right and seven on the left-hand



Plan of Brill Omnibus.

side. These are of the square top, double sash type, with the lower sashes arranged to raise, while the upper sashes are stationary. The front of the vehicle has two broad windows that drop into pockets.

The stairway to the upper deck is on the right-hand side of the rear of the car, separated from the lower compartment by a bulkhead with a sliding door, forming a vestibule. The rear end of the omnibus is rounded and is fitted with three double-sash windows, the lower sashes being arranged to raise. The stairway is of the semi-spiral type, with broad treads and an extremely easy curve. It projects only very slightly into the passenger compartment and in such a manner as not to interfere in any way with the head room of the passengers occupying the right-hand rear seat. In fact, the entire stairway occupies body space that is practically negligible when compared with the advantages of this arrangement.

On the upper deck the seats are arranged four on the right and seven on the left-hand side. Around the entire deck there is a sheet iron skirting, surmounted by a wire mesh screen guard carrying an

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iron railing. At the head of the stairway is a push button for signalling to the driver.

The omnibus is mounted on a 5-ton Pierce-Arrow chassis. The side sills are of yellow pine with a heavy angle reinforcement along the under side. Crossings are formed of channels, and additional strength is secured by means of three channels bolted through the side sills and angles and running underneath the chassis frame, to which they are secured by bolts running through the steel outrigger plates. The exterior is finished in olive green and gold striping.

It is of interest to note that the use of the front door on tramcars as an exit is coming largely into use in the United States. Recently the President of the Kentucky Traction Company defended it in the interest of safety and the reduction of hazard. Since this plan has been adopted on that company's undertaking there has been a marked decrease in the number of mishaps classed as step accidents. Chicago and Philadelphia, he observes, are among other cities where this practice prevails.

seats, two longitudinal seats holding two passengers each, and one four-passenger seat extending the width of the body in the rear. There are five windows on each side, the top being stationary and the bottom being arranged to raise, while a rain vision shield is provided for the driver. The cars are lighted from an 80 ampere-hour storage battery, which is charged from a 20 ampere Appleco generator, and they are heated by the exhaust from the motor, a valve being provided for turning the heat on or off as desired. The front wheels have 39 in. by 6 in. non-skid pneumatic tires, and the rear wheels 36 in. by 5 in. dual blocks. The cars are capable of a speed of 25 miles per hour.

CONVOY OF NAPIERS IN THE EAST.

As is well known, Napier business vehicles have been sent to all the Allied fronts in large numbers. Mr. H. T. Vane, the managing director of D. Napier and Son, Limited, 14, New Burlington Street,

Views of Part of a Napier Convoy Shipped to India.

AN AUTOBUS LINE ON THE PACIFIC COAST.

The Washington Autobus Company, a subsidiary of the Puget Sound Traction, Light, and Power Company, are now running a regular service from Seattle to Bothell, a distance of 16 miles, at a fare of 1s. 10½d., or 3s. for the return journey. The cars used have a tramcar body built by the J. G. Brill Company, and mounted on a 2-ton "Mack" chassis. The entrance is at the front, and the car is capable of seating twenty passengers. There are six cross

W., informs us that he has received nothing but praise of their behaviour under the most strenuous conditions. The accompanying photographs give two views of part of a convoy recently shipped to the order of the Indian Government for use in the East, where they will be subjected to the arduous conditions there at present prevailing.

Napier business vehicles are specially suitable for this class of work, combining as they do smooth and easy transit with absolute reliability, which is characteristic of British products.

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EASTBOURNE CORPORATION OMNIBUSES.

The accounts of this undertaking for the year ended March 31 last show a total income of £15,242, of which £13,913 was from fares, including £2,278 from the sale of books of tickets. Old chassis fitted with lorry bodies and hired out to other departments brought in £568. The total expenditure was £10,857. The number of omnibuses is 17, including four single-deck Milnes-Daimler, eight double-deck Milnes-Daimler, and four double-deck De Dion vehicles. Notwithstanding the increased working costs, there remains a net profit of £3,940, the gross profit being £4,384. In 1914-15 six of the best vehicles were acquired by the War Office. The average passenger receipts were 15·34d. per mile, as against 13·46d. in 1914-15. The working costs were just under 12d. per mile, excluding interest and loan repayments, and payments on account of omnibuses purchased out of revenue. Appended is the statement of accounts :

Expenditure.

1915. £ s. d.		£ s. d.	1916. £ s. d.
Running—			
	Wages of—		
188 11 3	Inspectors	226 14 1	
1,580 17 3	Drivers	1,356 7 5	
1,102 15 9	Conductors ...	992 3 8	
363 17 2	Cleaners	370 8 7	
80 14 6	Lampmen	92 17 3	
			3,038 11 0
£3,316 15 11			
2,769 14 7	Petrol and lubricating oil		2,741 1 2
68 17 4	Cleaning materials		54 4 9
55 9 7	Tickets, notices, stationery ...		56 3 7
1 0 0	Conductors' boxes, bags, punches, etc.		23 17 6
194 4 7	Carbide, lamps, repairs, etc. ...		80 15 9
228 7 0	Insurance (accident and fire) ...		187 0 0
12 10 0	Water for omnibuses		9 10 0
92 12 7	Uniforms		54 11 0
61 6 0	Licenses and registration		40 19 0
16 7 2	Time dials, time-table cases, destination boards, etc.		9 5 10
23 11 8	Waterproof aprons		33 7 9
33 7 4	Sundries		24 0 11
Tires—			
1,537 1 6	Charge for use of tires		1,431 11 1
26 0 0	Tires taken by War Office		—
£8,437 5 3			£7,784 19 4
Repairs and Maintenance—			
1,811 4 8	Repairing and repainting, wages of fitters, materials, machinery, etc.		1,749 12 9
3 15 0	Tools		37 19 5
40 19 6	Carriage		19 1 0
45 14 8	Electricity supply (power)		37 8 0
1 0 0	Spare engine and wheels (depreciation of)		13 10 0
—	Miscellaneous		4 11 5
£1,902 13 10			£1,862 2 7
Depot—			
66 2 10	Electric light, gas, and water ...		65 7 10
30 14 10	Coal and coke		71 3 8
30 2 0	Fittings, repairs, etc.		21 1 9
118 9 5	Rates, taxes, and insurance ...		103 17 2
Highways Department—			
8 17 7	General works account for repairs...		29 19 9
£254 6 8			£291 10 2
Management—			
400 0 0	Salary of general manager		400 0 0
192 19 11	Wages of clerks		204 3 5
125 0 0	Proportion salaries borough accountant and staff		125 0 0
46 11 9	Petty cash and postage		52 3 6
49 10 11	Advertising, printing, etc.		30 18 10
2 2 0	Office fittings and furniture ...		0 7 6
18 0 6	Telephone rent, etc....		17 16 10
£834 5 1			£830 10 1
General Expenses—			
16 17 2	Insurance of staff against accident		18 2 4
14 13 3	Compensation		20 0 0
7 13 9	Sundries		5 14 0
44 0 4	National Insurance Act, employers' contribution		44 17 6
50 0 0	Contribution to Borough Advertising Association		—
£133 4 6			£88 13 10
£11,561 15 4	Total expenditure		£10,857 16 0
4,975 5 2	Balance, being gross profit carried to net revenue account		4,384 4 8
£16,537 0 6			£15,242 0 8

Income.

1915. £ s. d.		1916. £ s. d.
Running—		
15,075 3 4	Passenger fares	13,913 8 1
458 13 0	Advertising on omnibuses	490 12 2
59 6 9	Hire of omnibuses	13 11 9
677 13 2	Hire of lorries	568 4 6
21 15 8	Sale of empty barrels, etc. ...	48 1 4
5 18 5	Miscellaneous	11 9 3
14 2 5	Conductor's overs	28 9 8
11 5 10	Sale of carbide to Highways and Drainage Committee	0 10 6
44 11 8	Conveying petrol by road	—
26 0 0	Tires taken by War Office	—
£16,394 10 3		£15,074 7 3
Repairs and Maintenance—		
13 0 8	Sale of old fittings, etc.	30 11 0
14 17 1	Pressing tires	15 14 0
—	Damage to omnibus repaid ...	4 5 0
25 19 3	Preparing chars-a-bancs for transport service	—
84 0 0	Lamps purchased by War Office ...	—
£137 17 0		£50 10 0
Depot—		
—	Transfer to Munitions Account – Proportion of charges	£97 3 5
General Expenses—		
4 13 3	Repayment of compensation by insurance company, etc.	20 0 0
£16,537 0 6	Total income	£15,242 0 8

Net Revenue Account.

1915. £ s. d.	Expenditure.	£ s. d.	1916. £ s. d.
744 8 3	Interest and repayment of loans raised by mortgage	258 19 9	
85 11 0	Mortgage redemption fund (one year's contribution)	85 11 0	
7 15 6	District fund (proportion of capital charges on land occupied by depot ...	7 15 6	
20 9 4	Income tax	116 0 8	
1 2 1	Bank interest	—	
1,144 11 1	Instalment of cost of De Dion and Leyland 'buses	210 0 0	
			678 6 11
£2,003 17 3			
3,078 4 3	Balance, being net profit carried to profit appropriation account ...		3,940 9 5
£5,082 1 6			£4,618 16 4

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INCOME.

1915. £	s.	d.		1916. £	s.	d.
4,975	5	2	Gross profit from revenue account ...	4,384	4	8
105	0	7	Bank interest	234	11	8
1	15	9	Repaid income tax	—		
£5,082	1	6		£4,618	16	4

PROFIT APPROPRIATION ACCOUNT.

EXPENDITURE.

Transfer to depreciation fund	3,078	4	3
Balance unappropriated, March 31, 1916	3,940	9	5
	£7,018	13	8

INCOME.

Balance at April 1, 1915	3,078	4	3
Profit for year brought down	3,940	9	5
	£7,018	13	8

DEPRECIATION AND RESERVE FUND.

EXPENDITURE.

Balance of fund, March 31, 1916	8,358	14	0
	£8,358	14	0

INCOME.

Balance of fund at April 1, 1915, as per last abstract	5,280	9	9
Transfer from profit appropriation account	3,078	4	3
	£8,358	14	0

THE CONTINENTAL TYRE COMPANY.

The House of Lords on June 30 allowed the appeal, Daimler Company (Limited) *v.* Continental Tyre and Rubber Company (Great Britain), Limited, which raised the question whether, having regard to the enemy character of the shareholders and directors of the Continental Company, payment could be enforced by the company during the war of debts owing to them. Mr. Justice Scrutton decided that being registered as an English company the respondent company could sue, and the Court of Appeal (Lord Wrenbury, then Lord Justice Buckley, dissenting) upheld the judgment. The hearing of the appeal occupied several days in the House of Lords before Easter, when judgment was reserved.

The Earl of Halsbury, in moving that the appeal be allowed, said that in his opinion the whole discussion was solved by a very simple proposition—that in our law when the object to be obtained was unlawful, the indirectness of the means by which it was to be obtained would not get rid of the unlawfulness, and in this case the object of the means adopted was to enable thousands of pounds to be paid to the King's enemies. It seemed to him too monstrous to suppose that for an unlawful, because after a declaration of war, a hostile purpose, the forms of limited liability should be used and enemies of the State, while actually at war with us, be allowed to continue trading, and to sue for their profits in trade in an English Court of Justice.

Lord Parker said that the directors of the plaintiff company were the King's enemies, and as such were incapable of exercising any of the powers vested in them as directors of a company incorporated in the United Kingdom. They were incapable, therefore, of authorising the institution of this action.

Lord Atkinson concurred on the question of the authority of the secretary to issue the writ, but on the main question said that, the question of residence of the company apart, he did not think the legal entity of the company could be so identified with its shareholders, or the majority of them, as to make their nationality its nationality, or their status its status.

Lords Shaw and Parmoor agreed in the decision of the Court of Appeal on the main question, but thought the appeal should succeed on the question of the secretary's authority.

The appeal was accordingly allowed, but without costs.

A PETROL SUBSTITUTE.—The city engineer of Hull has reported favourably on the use of a petrol substitute which he has obtained at 1s. 6d. per gallon on a six months' contract. The fuel is produced by a local firm.

MOTOR VEHICLES FOR MUNICIPALITIES

LEEDS GAS COMMITTEE have purchased two motor wagons.

NEWTON ABBOT COUNCIL have resolved to purchase a steam lorry at a cost of £727.

ROCHDALE COUNCIL propose to obtain a motor wagon for the cleansing department.

BLACKPOOL GAS COMMITTEE have agreed to obtain a motor lorry for the delivery of coke.

CROYDON WATER DEPARTMENT have the purchase of a motor wagon under consideration.

STEPNEY COUNCIL have agreed to purchase a petrol-driven sweeping machine for £620.

CROYDON ELECTRICITY COMMITTEE have placed an order with Edison Accumulators, Limited, for a wagon fitted with a tipping body.

ILFORD COUNCIL have decided upon the purchase of a Laffly road sweeper and a petrol motor chassis with water-tank holding 800 gallons.

SHEFFIELD TRAMWAYS COMMITTEE have placed a contract with the Steel Barrel Company, of Uxbridge, for two petrol storage installations.

LOUGHBOROUGH COUNCIL have authorised the purchase of a 2-ton electric truck at a cost of £600, to be used for the cartage of coal between the railway siding and the electricity works.

WALSALL TRAMWAYS COMMITTEE have placed an order for four further Daimler omnibus chassis, with single-deck bodies, in order to carry the employees of a firm engaged on Government work.

BRADFORD ELECTRICITY COMMITTEE have ordered two electric vans from the Jowett Motor Manufacturing Company, of Bradford, for the conveyance of coal. The vehicles will have chassis of the General Electric Vehicle Company's manufacture. Each will have a capacity of five tons, and will be fitted with electrically-operated tipping gear, one wagon being equipped with Edison cells and the other with an ironclad exide battery. The power-station is situated about 500 yards from the railway siding where the coal is received, and it is estimated that each wagon will be able to handle 100 tons of coal daily. It is expected that the wagons will be able to do the day's work on a single charge, effecting a saving of £500 per annum as compared with horse traction.

BRITISH AUTOMOBILE TRACTION.

The report of this company for the year ended December 31, 1915, shows that the net traffic receipts and other revenues, after providing for depreciation, amounted to £18,011. After deducting general expenses and other items chargeable to revenue there is a surplus of £9,438, making, with £4,249—the balance brought forward from the previous year—a total of £13,687, which the directors propose to appropriate as shown in the accounts, viz. :—To reserve, £2,000 ; to dividend on the ordinary shares at the rate of 8 per cent. per annum, £7,279 ; to be carried forward, £4,408 ; total, £13,687. The rolling stock and plant have been maintained in good working order and repair. On October 28, 1915, the capital of the company was increased to £150,000 by the creation of 67,825 additional ordinary shares of £1 each ; 61,375 shares have since been issued, making the total issued capital of the company as at December 31, 1915, £138,273. During the year the operations of the company have been carried on under exceptionally trying conditions due to the difficulty of obtaining rolling stock and sufficient skilled labour ; the directors nevertheless consider the results satisfactory.

STEVENS PETROL-ELECTRIC VEHICLES, LTD.

This new private company was registered on June 27, the capital being £3,000 in £1 shares (1,500 "A" and 1,500 " B ") to carry into effect an agreement dated August 19, 1915, between W. A. Stevens and Joseph Sankey and Sons, Limited, and to carry on the business indicated by the title and that of agents for the sale of motor and other vehicles, etc. The subscribers are :—W. A. Stevens, " Castlemaine," London Road, Maidstone, engineer ; F. O. Collis, 72, King Street, Maidstone, solicitor. The number of directors is not to be less than two or more than five. Mr. W. A. Stevens is the managing director, and two others will be nominated by the holders of "A" shares.

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MOTOR TRAFFIC.

The company, which is one of the British Electrical Federation group, paid a similar dividend for 1914, absorbing £5,076. The net profit in that year was £11,000, and £2,000 was placed to reserve. In 1914 a large number of vehicles belonging to the company and to other undertakings in which the company was interested were impressed by the military authorities, prior to which the operations of the company were considerably enlarged by the extension of existing services and by acquiring interests in new districts.

OMNIBUS DEPRECIATION AND INCOME TAX.

A Joint Committee of the Municipal Tramways Association, the Tramways and Light Railways Association, the London Omnibus Owners' Federation, the Provincial Omnibus Owners' Association, and the Institute of Municipal Treasurers and Accountants, submitted a report to the chief inspector of taxes on October 1, 1915, asking that a uniform method be arrived at for determining depreciation allowances for income tax purposes. The Joint Committee were requested to furnish the department with the evidence available bearing upon the question, with a view to a deputation being received at a later date. Mr. A. de Turckheim, secretary of the Tramways and Light Railways Association, has informed the members of the Association that further and detailed evidence was sent in on May 3, and the matter is now under consideration.

ELECTRIC VEHICLE COMMITTEE.

At the June meeting of the Electric Vehicle Committee, Mr. A. C. Cramb presided in the absence of Mr. R. A. Chattock. It was announced that, for the present year, the following had been nominated by their respective Associations to act as their representatives on the committee :—Society of Motor Manufacturers and Traders—Mr. T. C. Pullinger, of Arrol-Johnston, Limited, Heathhall, Dumfries; Tramway and Light Railways Association—Mr. W. T. Robson, general manager, Corporation Tramways, Southampton; Incorporated Association of Electric Power Companies—Mr. J. S. Highfield, chief engineer, Metropolitan Electric Supply Company. It was decided to issue an invitation to the Royal Automobile Club of Great Britain to nominate a representative. Arrangements were decided upon with a view to further increasing the circulation of *The Electric Vehicle* the subscribers for which number upwards of 2,000. It was decided to inquire from the electric supply undertakings as to whether they could make use of a poster if the committee had one printed. The matter of a standard insurance policy for electric vehicles was deferred until the next meeting. A sub-committee, consisting of Mr. E. S. Shrapnell-Smith, Mr. E. W. Curtis, and the honorary secretary (Mr. F. Ayton, Ipswich Electrical engineer and tramway manager), was appointed to draft a letter to the Board of Trade with a view to excluding electric commercial vehicles from any prohibition of the import of foreign-made commercial motor vehicles. The committee's attention has been drawn to the fact that industrial electric trucks imported into the country are not being provided with the standard charging plug. The committee is unanimously of the opinion that these trucks ought to be provided with the standard fitting, and the secretary has been instructed to write to the manufacturers to that effect. The date of the next meeting was fixed for July 28, at 2.45 p.m.

MOTOR TRAFFIC NOTES.

Burton Corporation's Omnibus Powers.—A Provisional Order has been obtained by Burton Corporation removing the restrictions imposed by their Act of 1901 in respect to the running of motor omnibuses in connection with the tramways.

Manchester Omnibus Service.—The Tramways Committee on June 19 started a half-hourly motor omnibus service between Slade Lane, Longsight, and Palatine Road, Withington. Omnibuses will run along Burnage Road, Fog Lane, and Lapwing Road, to the tramway terminus in Palatine Road.

Erith Omnibus Project Abandoned.—In consequence of the arrangements made with the Ministry of Munitions and the omnibus companies, Erith Urban Council have informed Woolwich Corporation that they have abandoned the application for a Provisional Order to enable their tramways department to run motor omnibuses.

Increased Fares at Newcastle.—Owing to the increased cost of petrol, the Newcastle Corporation Tramways Committee have decided to increase the fares on motor omnibuses. The increase will range from a halfpenny to a penny. Soldiers will be charged full fare on the omnibuses and children half fares, but no fare will be less than a penny.

Omnibus Restriction in Croydon.—Under the Local Government (Emergency Powers) Act, the Croydon Corporation have passed the following resolution :—"The use by any omnibus of any route that has not been used within two years prior to March 1, 1916, without the consent of the Corporation, or if unreasonably withheld, of the Local Government Board, is forbidden under penalties."

Women Motor Drivers.—With the calling to the colours of married men a considerable increase is taking place in the number of women engaged in driving private and commercial motor cars. Lady Randolph Churchill, in an interview with the representative of a New York journal, has stated that "one woman, because of sheer ability, has been given general charge of all the motor cars connected with the great arsenal at Woolwich."

Motor Vehicles in Municipal Work. The Institute of Cleansing Superintendents will meet at Cardiff on July 17-20 for their annual conference. Mr. W. Harper, the city engineer, will present a paper on the results attained by the use of steam tractors in cleansing work; Mr. J. Terry, of Nottingham, will describe the work of electric vehicles in the removal of house refuse; Mr. W. Greig, of Glasgow, will deal with "Street Cleansing by Motors"; and Mr. J. Bee, of Liverpool, will submit a paper on "Street Watering with Electric Vehicles."

Reliability of Straker and Squire Vehicles.—On the purchase by Southwark Council of a motor gulley van from Straker and Squire, Limited, in 1913, the company agreed to maintain the vehicle for a period of five years for £90 per annum. The borough engineer reported on May 31 that it is unnecessary to continue the agreement for five years, and that the company were willing to cancel the contract two years from the date of execution, and to supply during the two years the necessary parts coming within the contract, provided the Council undertook the fitting. The authority have adopted that course.

The Zenith Carburettor.—An important point about the Zenith carburettor is that, once set, it is not affected by climatic changes. A Weston-super-Mare motorist has just tested this under trying conditions. His outward journey to Oxford was accomplished through mud, rain, fog, hail, and wind. His consumption for the 100 miles was exactly two gallons of No. 2 spirit. The return journey was made in much finer weather, although there were some storms, and the consumption worked out just under two gallons of No. 1 spirit. Allowing for the slight gravity difference in the spirit, this makes the performance as nearly as possible equal, although one was with a heavy atmosphere and the other with a much more rarefied one.

Brighton Omnibus Licence Question.—At a meeting of the Brighton Town Council, on June 15, Alderman Stringer, referring to the application made by Thomas Tilling, Limited, for licenses for 14 omnibuses, and also to that of the Brighton, Hove, and Preston Omnibus Company, said that in his opinion the time had not come to grant licenses to Messrs. Tilling. The Watch Committee were still of the opinion that the roads were too narrow for competition between omnibus companies. Councillor Tindall, taking the opposite view, said that 12,000 signatures had been obtained by Messrs. Tilling to the petition which they had put in. The proposal that Messrs. Tilling should be granted licenses was rejected by a large majority, but the license to the other company was renewed. Before these decisions were arrived at the Hove Council renewed the licenses to both companies for two months. No announcement has yet been made of the result of the company's offer to take over the business of Messrs. Tilling, Limited.

No Petrol Licence Duty on Trade and Hackney Carriages.—In connection with the issue of licenses to restrict the use of petrol, and the imposition of an additional tax of 6d. per gallon, Mr. Montagu (Secretary to the Treasury) announced in the House of Commons on June 26 that the Government had intended to impose half duty on trade cars. Representations had been received by the Government, and although they proposed to issue licenses, there would be no duty charged on the petrol for trade cars. Mr. Montagu moved a clause providing that a motor car shall not as a hackney carriage be exempt from license duty unless the car is used solely as a hackney carriage. The clause was agreed to. A clause entitling to relief from the license duty persons whose cars are used exclusively for any Government service was agreed to. On June 27, the House adopted a resolution, proposed by Mr. McKenna (Chancellor of the Exchequer), providing that motor-car owners, except the owners of commercial vehicles, should take out a license authorising them to be supplied with petrol, upon which they should pay a duty of 6d. per gallon, qualified medical practitioners and registered veterinary surgeons to get licenses at half rates.

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THE

Tramway & Railway World

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."

Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

WALTHAMSTOW URBAN DISTRICT COUNCIL.

ELECTRICITY DEPARTMENT.

The Council invite Tenders for the supply, delivery and erection of the undermentioned :—

Contract No. 37.—500-k.w. rotary or motor converter.
Contract No. 38.—Extra high tension switchgear.
Contract No. 39.—Low tension switchgear.

Copies of the general conditions, specifications, forms of tender and drawings can be obtained from Mr. G. R. Spurr, Electrical and Tramways Engineer, Priory Avenue, Walthamstow, on depositing the sum of One Pound (£1), which amount will not be refunded on receipt of a bona-fide tender, and to the successful tenderer on completion of the contract.

Additional copies of the specifications, etc., may be had on payment of Five Shillings (5s.) for each copy, which amount will not be returnable. Sealed tenders, on the prescribed forms, endorsed "Tender for Rotary or Motor Converter" (or as the case may be) must be delivered by post only to the undersigned not later than noon on Wednesday, July 26, 1916.

The Council do not bind themselves to accept the lowest or any tender.

The contractor will be required to pay the whole of the workmen such rates of wages, and to observe such hours of labour as are recognised by the various trade unions, and in force at the time of signing the contract.

C. SYDNEY WATSON,
Clerk to the Council.

Town Hall, Walthamstow.
July 11, 1916.

SOUTH INDIAN RAILWAY COMPANY.

CARRIAGE FITTINGS.

The South Indian Railway Company, Limited, are prepared to receive tenders for the supply of Carriage Fittings (Metre Gauge), comprising :—

Wrought iron and steel.
Hardware.
Glass.
Screws.
Sundries.

Specifications and forms of tender may be obtained at the Company's offices.

Tenders, addressed to the Chairman and Directors of the South Indian Railway Company, Ltd., marked "Tenders for Carriage Fittings," must be left at the offices of the Company not later than one o'clock on Wednesday, July 19th, 1916.

The Company is not bound to accept the lowest or any tender.

A charge, which will not be returned, will be made of 10s. for each copy of specification.

Copies of the drawings may be obtained on payment at the office of Robert White, Esq., M.Inst. C.E., Consulting Engineer to the Company, 3, Victoria Street, S.W.

91, York Street, Westminster, S.W.
June 28, 1916.

COUNTY BOROUGH OF SOUTHEND-ON-SEA.

The Corporation invite tenders for the purchase of the following scrap metals :—Five tons of trolley wire, two and a half tons of copper cable, etc., half a ton of gunmetal and one ton of lead, zinc., etc.

Further particulars can be obtained on application to Mr. Robert Birkett, Borough Electrical Engineer and General Manager, Electricity Works, London Road.

POSITION VACANT.

CITY OF SALISBURY.

CITY SURVEYOR'S TEMPORARY ASSISTANT.

The Town Council invite applications from men ineligible for military service for the appointment of a temporary assistant in the office of their City Engineer and Surveyor in consequence of the absence of the present Assistant on Active Service.

Applicants must have had experience in a municipal engineer's office.

The appointment to be determinable by a month's notice.

Applications, in candidate's own handwriting, stating age, experience, salary required (the salary previously paid to the Temporary Assistant being at the rate of £104 per annum), when able to commence duties, and accompanied by copies of not more than three recent testimonials, endorsed "City Surveyor's Assistant," must reach me not later than noon on Monday, the 24th instant.

Canvassing is strictly prohibited.

FRANCIS HODDING,
Town Clerk.

Municipal Offices, Salisbury.
July 6, 1916.

GOVERNMENT OF TASMANIA.

The Hydro-electric Department of the above Government invite applications from qualified electrical engineers for the position of Chief Assistant to the Department.

Applicants must have extensive experience in the design, construction, and operation of E.H.T. plants and transmission, and in the commercial public supply of electricity, preference being given to applicants having experience on hydro-electric service.

Salary £550 per annum, payable in Hobart, with a three years' engagement and first-class return passage.

Applications, stating age and qualifications, and enclosing not more than three recent testimonials, to be forwarded to the Agent-General for Tasmania, 56, Victoria Street, S.W., not later than July 25.

The Department's present plant is of 7,500 kw. capacity, hydraulic fall 1,000 feet, transmission 88,000 volts 64 miles.

BOROUGH OF LOUGHBOROUGH.

The Electricity Committee are prepared to receive applications for the post of Engineer and Manager of their undertaking, at a salary of £300 per annum.

Candidates must have had experience in the operation and upkeep of extra high tension alternating current and low tension three-wire direct current turbo generating plant and distributing systems, and the candidate appointed will be required to devote the whole of his attention to the duties of the office.

Applications, giving full particulars as to age, qualifications, and experience, accompanied by copies of three testimonials, and stating how soon duties can be taken up, must reach the undersigned not later than July 24.

Canvassing, directly or indirectly, will disqualify.

HARRY PERKINS,
Town Clerk.

Town Hall, Loughborough,
July 4, 1916.

FOREMAN PLATELAYER.

Wanted, Working Foreman Platelayer. Permanent job. Apply, giving particulars of experience and wages required, Engineer and Manager, Rhondda Tramways Company, Ltd., Porth.

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HARD WEAR RESISTING.
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THE
Tramway AND Railway World

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Sixty-four issues are published annually, including twelve large numbers which are fully illustrated and printed on art paper.

SUBSCRIPTION.

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FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, JULY 15, 1916.

OVERHEAD TROLLEY RISKS.

Of late years there have been fewer mishaps arising from the dewiring of the trolley wheel, and taking tramways as a whole these accidents may now be regarded as infinitesimal in comparison with the mileage run. The possible effects of the wheel leaving the trolley wire must not, however, be regarded as negligible, and although dewiring cannot be prevented the industry stands to benefit if an effective means can be devised for keeping a trolley arm under control after it has left the wire. A retriever is not unknown on centre running installations in this country, but it does not appear to be suitable for use on side running routes. To judge by the evidence given by Mr. J. B. Hamilton, Mr. C. R. Everson, Mr. E. N. Munro, and other experts in the action for damages against the Plymouth Corporation, the appliance performs only the modest task of winding up the slack in the rope. What is required is a method of bringing the arm under control at its base, thus preventing a repetition of the Plymouth accident. In that case the arm struck a standard, resulting in the destruction of the spring and the fall of the arm on to a passenger's head. Descriptions and advertisements in American journals indicate that considerable attention is devoted in that country to retrieving the arm at its base, but apparently official information as to the effectiveness of the device is lacking. While negligence on the part of the Corporation was not established in the Plymouth action, damages were given against them seemingly on an allegation that the young conductor was not standing where he could see the arm while the car was coasting. That is a point upon which managers would do well to place emphasis in their instructions to the great number of employees who are now temporarily discharging the duties of conductors. While the great increase in the number of top covered cars largely removes the risk of passengers being injured by trolley accidents, there still remains a danger for other traffic and pedestrians due to the severance of the wheel from the arm. Now that trailer cars have come largely into use in London there is a risk that the head may fall upon the unprotected top deck passengers when the trailers, as some of them do, run on an overhead extension of a conduit track. That the peril from a falling head is not a slight one was shown this week on a section of line in South London. A car without a trailer was running at the maximum rate on a stretch where sixteen miles per hour is permitted, when the wheel left the wire. Speedily as the motorman pulled up, he was unable to prevent the head striking either the clamp or the span wire supporting the centre trolley wire. The consequence was that the head came off the end of the arm and fell to the ground. There was, of course, a severance of the rope, this occurring at the point where it leaves the arm in a loop to the frame of the wheel. Accidents of this nature are not unknown on the comparatively small overhead mileage of the London County Council Tramways, and on this and other undertakings it would conduce to the public safety if a more substantial secondary means of securing the head could be devised.

APPLICATIONS TO THE TRIBUNALS.

A serious prospect is before the Rotherham Tramways Committee. On July 7, Mr. E. Cross, the general manager and electrical engineer, attended before the local Tribunal and applied for exemptions for various employees. The list had been gone through by the military representative, the chairman of the committee, and Mr. Cross. The court granted conditional exemptions to three inspectors, and a month's exemption to sixteen motormen, while the applications respecting four other motormen were refused. Repairers at the sheds and the overhead workers were exempted with two exceptions. In the latter cases a month's grace was allowed. Mr. Cross said he would agree to the four motormen going to the army if he could obtain substitutes. The car mileage, he said, was increasing week by week owing to the increase of munition workers. There were sixty women conductors and nearly all the cleaners were women. A member of the Tribunal asked if women were not driving cars in some towns, and Mr. Cross replied that he would not like to take the responsibility of employing women as drivers in Rotherham, where a great strain was placed on motormen in applying the brakes on some of the hills. The court suggested that women drivers should be employed between Westgate and Canklow, and that intending passengers should be required to walk to Westgate instead of entering the cars at College Square. By adopting that course the High Street hill would be avoided. In order to enable such an arrangement to be made the exemption of the motormen was limited to one month. The Tribunal informed Mr. Cross that it would be no use coming there a month hence and bringing the names up unless he had some better proof. He would have to get females or some one else to drive.

At Teddington Tribunal a London United Tramways Company's conductor, who had been passed for home garrison duty, was allowed three months' exemption, and was ordered to join the Volunteer Force during that period.

TRAMCAR ACCIDENTS.

A Metropolitan Electric Tramways Company's car met with a serious accident at 8.15 p.m. on June 11, while running from Edgware Road to Sudbury. The car, which was a double-deck vehicle with a top cover, contained about seventy passengers. It is stated that an axle broke while the car was descending a sharp gradient near the Regent's Canal bridge in Harrow Road, with the result that the vehicle left the metals, swerved to the left, crashed into the wall of the G.W.R. goods station, and overturned. Nine persons were detained in hospital for treatment and about fifty others received attention for less serious injuries. Two L.C.C. motor ambulances and two L.G.O. omnibuses rendered great service in conveying the injured to the hospitals. A member of the medical staff at St. Mary's Hospital attributes the small number of serious injuries to the circumstance that the top cover of the car prevented the passengers being thrown off into the street. It is reported that every window of the car was smashed.

At Leeds, on July 10, a verdict of accidental death was returned at the adjourned inquest on a tramcar conductor who died from injuries sustained in the collision, on June 13, between his car and a ballast wagon that had run away down the tramway from the Wortley Fire Clay Company's works. Evidence was given by a fire-clay worker that it was the practice of the drivers of tip-wagons on arriving at the works to call upon him to knock off the brakes. On this occasion the wagon driver (who has been severely injured) pulled over the tips; the witness attended the brakes. Unfortunately, the front brake had not been put on, and when he released the back brake the wagon ran down the incline. He ran after it, but slipped as he was running, and was dragged some distance by the vehicle. The jury recommended that in future there should be two persons on the tip-wagons—one to attend to the brakes.

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EMPLOYEES' DEMANDS.

The Amalgamated Association of Tramway and Vehicle Workers having communicated with the Chief Industrial Commissioner respecting their application to Manchester Tramways Committee for an additional war bonus, Sir George Askwith has forwarded a copy of the letter to the Committee. The latter instructed the general manager to reply that they cannot see their way to grant the application, and that there appears to be no other course than to refer it to the Government Committee on Production.

An alternative to granting a war bonus has been suggested by Mr. J. Dalrymple, general manager, Glasgow Corporation Tramways. The car employees, male and female, had applied for a bonus of 6*s*. per week as from March 1 last. Mr. Dalrymple reported that there are 3,067 drivers and conductors, and an increase of 6*s*. per week would mean an additional annual expenditure of £47,845. (The sum recommended to be handed to the Common Good from last year's profits was £43,548.) The hours worked by the employees in Glasgow were shorter than those on any other tramways, and he suggested that the drivers and conductors might be asked, for the period of the war, to work one hour longer per day, which would enable them to earn 3*s*. to 4*s*. 6*d*. more per week. Applications for a similar bonus have been received from the truck and controller hands, from paviors for 5*s*. per week, and from the permanent way men, car workers and handy men at Coplawhill car works for 4*s*. per week, while the carters asked for 1*s*. per week. A sub-committee of the Tramways Committee reported against granting the applications, and their report together with that of the manager came before the Tramways Committee on July 6. The committee decided to consider the whole matter at a special meeting to be held in time to allow a recommendation to be submitted at the meeting of the Council on August 10. The manager was instructed to prepare an extended report showing the wages paid to the same classes of workers in other towns.

Rotherham Tramways employees recently applied for the extension of the additional war bonus to the women conductors, and that time and a half should be granted them for Sunday work. On July 5 the Special Wages Committee advised that the requests be not acceded to, but the Council referred the report back. The same course was adopted in regard to a recommendation that in all cases where workmen in the tramways department are not granted their annual holiday, they be paid an additional sum equivalent to the wage due for the number of days' holiday not granted (in addition to the war bonus or merit pay), and in the case of the motormen and conductors, a wage equal to sixty-three hours per week.

The London United Tramways Company having repudiated the validity of a previous ballot of the employees taken by the London and Provincial Union of Licensed Vehicle Workers, a new ballot was taken during the week beginning on July 10. The question submitted was whether the employees were desirous of the union representing them either before the company or at an arbitration board on questions of wages and working conditions.

MISCELLANEOUS NEWS AND NOTES.

Volunteer Motormen at Bradford, who have recently offered their services, now number thirty.

Abuse of Half-Fare.—Fines of 10*s*. 6*d*. and 21*s*. have been inflicted at Glasgow in cases in which girls had represented that their age was only 15 years in order to obtain tramcar tickets at half-fare.

Halfpenny Tickets instead of Transfers.—The discontinuance of transfer tickets has been sanctioned at Preston. In lieu thereof halfpenny tickets are being issued, available on the former transfer stages.

Regulation of Passengers at Portsmouth.—The tramways department recently erected a barrier at North End in order to regulate the boarding of the cars. It has answered its purpose very effectively.

Repairs on The London United Tramways.—The surveyor to Hampton Wick Council reported on July 5 that the London United Tramways Company were about to carry out repairs to the track in Hampton Court Road.

A Manchester Doubling.—Following a widening in Cross Street, between King Street and Albert Square, the single line of tramway in the first mentioned thoroughfare has been doubled. This has greatly facilitated the traffic.

Municipal Tramways Conference will be held at the Surveyors' Institute, Great George Street, Westminstee, S.W., on Thursday and Friday, September 21 and 22. Owing to the war the proceedings, as last year, will be confined to two days.

Charges for Parcels.—Mr. C. J. Spencer states in his annual report that there is a probability of the scale of charges for parcels delivery on the Bradford Tramways being increased, in consequence of the increased cost of running the department.

Charge for Traction Energy.—Although the receipts of Darwen Corporation Tramways for the first three months of the present financial year show a decrease of over £100, the Council have increased the charge for energy to 1½*d*. per unit, which is equal to £400 per annum.

Discount Tables.—The Edison and Swan United Electric Light Company, Ltd., have issued a convenient little pocket-book of discount tables. They contain several tables which are not to be found in the ordinary discount books, and should be useful in many offices.

Ex-Soldiers as Sub-Station Attendants.—A first batch of fourteen disabled sailors and soldiers will about the third week in July have completed a four-weeks' course of instruction at the Northampton Institute, for the purpose of enabling them to qualify for training as sub-station attendants.

Proposed Croydon Extension.—At the next meeting of Croydon Corporation, consideration will be given to a recommendation by the Tramways Committee for an extension from the Addiscombe terminus to Woodside Green, a distance of 1,540 yards at an estimated cost of £17,551; also an extension of depot and workshop accommodation, at an expenditure of £14,040.

Automatic Trolley Reversers have been fitted at the termini of several routes of the Sheffield tramways and the number is being gradually increased. It is expected that all terminal points will eventually be thus fitted. The new arrangement enables the poles to be automatically reversed without leaving the wires, and it has the advantage of maintaining the light in the car.

Rhondda Tramways Assessments.—Glamorgan Quarter Sessions have allowed the appeal of Rhondda Tramways Company against the gross rateable value of the tramways being fixed at £21,500, and the net value at £5,500 by the Pontypridd Union. The amounts have been reduced to £20,500 and £4,500 respectively. An appeal against the rating of the generating station at £2,500 was dismissed with costs.

Merit Badges.—As the result of a report presented by Mr. W. Murray, the manager, Walthamstow Council have adopted a system of merit badges for the tramways employees. The first bar will indicate three years of approved service; two bars, five years, three bars, ten years; and each succeeding bar an additional five years of approved service. Each bar will carry with it a bonus of 1*s*. per week.

Petrol Control Committee. Representatives of omnibus undertakings and commercial motor users, who recently appeared before the Petrol Control Committee, were informed that the estimates of consumption received from users were in excess of the normal consumption of the whole of the vehicles in the country. The Committee, it is reported, stated that the demands would have to be reduced by one-half in certain quarters, including omnibuses and chars-a-bancs.

Prevention of Overcrowding.—A Canadian munition worker was summoned at Newcastle for refusing to leave the step of a tramcar, which was full. His refusal led to the car being run into a siding to avoid delaying other cars. To the justices the man gave the excuse that he had come to England to "do his bit" and he did not wish to break his good record by being late. Previously, he said, passengers were allowed to hang on by their teeth. He was fined ten shillings and costs.

Seats for Conductors. Mr. J. M. McElroy has patented a seat for tramcar conductors. We have not yet had an opportunity of inspecting the plans of the Manchester general manager's invention, but it would be difficult to improve on the unobtrusive fold-up appliance for the use of women conductors, which is supplied by the Equipment and Engineering Company and was illustrated in our advertisement columns of June 8. Sheffield Council, on July 12, were asked by the Federated Health Association to provide seats for women car conductors, similar to those fitted to the Glasgow cars.

New Uniforms at Portsmouth.—At a cost of nearly £1,000 the male and female employees of Portsmouth Tramways Committee have been all provided with new uniforms simultaneously, and at midday on Sunday, July 9, they assembled for inspection by Councillor J. Timpson (chairman) and the members of the committee. Mr. Timpson expressed to Mr. W. R. Spaven, the general manager, the satisfaction of the committee at the smart appearance of the employees. The women conductors' uniforms are of dark grey material and red edgings.

Manchester Tramways Under the Munitions Act.—At Manchester Munitions Tribunal on July 7 a lad of 15 applied for a leaving certificate from Manchester Corporation Tramways parcel service, in order to enable him to become an apprentice. Mr. J. M. McElroy, in opposing, stated that the department was certified as being a munition works, and that the parcel department was an important branch largely used for the transport of small parts of munitions. The case was a test one. The parcel department had to be run almost entirely by boys, as practically the whole of the adult male staff had joined the colours. Eventually Mr. McElroy agreed to release the lad in November.

Height of the Lifeguard Gate.—Mr. R. Birkett, general manager, Southend Corporation Tramways, at an inquest on a six-year-old child, who was killed by a car, gave evidence that the lifeguards were examined before the vehicle left the depot. In reference to a witness's statement that the guard went down on top of the child, whereas, if it had been a second or two sooner in falling, the child would have been picked up Mr. Birkett suggested that the child's feet might have passed under the gate first and reached the tray before the gate was lifted high enough to work the apparatus. The jury returned a verdict of "accidental death," and expressed the opinion that the gate should be nearer the road. The Town Clerk said the apparatus was in conformity with the Board of Trade regulations.

Output at Hadfield's Steel Works.—In welcoming the forty overseas delegates of the Empire Parliament Association to Hadfield's Steel Works, Sheffield, on July 11, Sir Robert Hadfield said that the commercial output of the works was now 10 per cent. instead of 90 per cent., as before the war. That was an indication of the growth of the armament output. It had often been said that we owed much to German science, but he could quote the saying of a

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well-known authority, "All you have seen here to-day has been done by means of British brains and applied British science." In fact, in the past, Germany had even copied, and every German armour-piercing shell fired in this war had been fired with a British armoured cap. The Germans ascertained how the cap was made through our patent laws revealing the details.

Increase in Traffic at Sheffield.—The report of Sheffield Tramways Committee for the past year states that the department's resources have been severely taxed to meet the demand for increased services required in consequence of the large number of extra hands employed in the munition factories. Workmen's traffic morning and evening has been specially heavy and also the increase in the ordinary traffic at all hours of the day, so that records of passengers carried and total receipts have been made and broken week after week. On the Tinsley service, for instance, there was an increase in the traffic of 40 per cent. To carry on the service it became necessary to employ women as conductors, and the only remaining men conductors are those unfit for motormen and not eligible for the Army. Women are now engaged in car cleaning and are gradually replacing men at this work. The total number of women employed is over 700, the total staff aggregating 1,807.

Difficult Working Conditions at Coventry.—Councillor H. W. Wale, vice-chairman of the Tramways Committee, in submitting the annual report of the general manager to the City Council, acknowledged the loyalty, skill, and energy put into the undertaking by every member of the staff; they had been magnificent, particularly the women. Owing to the reduction of the staff the service had been materially decreased in the aggregate, but on one section where the ordinary service was eight cars they were running, particularly at night, twenty cars. The committee would do everything in their power to release men for the army, but it was in the national interest, especially having regard to conveying munition workers, that the minimum amount of labour they at present employed should be retained. While the number of passengers was nearly eleven and a half millions, the accidents were of a trivial character. This spoke volumes for the efficiency of the staff, because the Coventry traffic problem was one of the most complicated that obtained in any urban centre.

Prices of Scrap Copper and Rails.—Mr. W. Marsh, the tramways general manager and engineer at Brighton, in his annual report states that of recent years the department has made it a practice to carry a heavy stock of material, if possible, sufficient to last twelve months. This stock was considerably augmented in the first year of the war before the heavy rise in prices took place. No scrap copper, either from the cars or the overhead line, was sold in the spring of 1915 at the usual time. The manager was certain it would rise in price, and when about four tons were sold in March, 1916, it fetched double the market price of the previous year. Trolley wire had been taken down during the year and replaced with new which was bought before the rise took place, the old wire being sold at a price which not only more than paid the cost of the new wire and labour and materials for erecting, but left a profit on the transaction. The new wire cost £72 per ton and the old was sold for £120 per ton. Old worn-out rails are realising £7 per ton, while a few years ago new rails only cost £6 5s. per ton.

Cars and Plant Needed for Wellington Tramways.—A report submitted to Wellington (N.Z.) Council on May 18, by Mr. W. H. Morton, the general manager of the tramways, stated that twenty more cars were required. A new Babcock and Wilcox boiler was expected shortly. Inquiries had been made as to the possibility of obtaining an additional generator, but so far there appeared to be no possibility of increasing the plant for some time to come. After the new boiler and one generator had been erected, there would be no room in the power station for additional machinery, but with the installation of a storage battery it would be possible to continue for some time. The undertaking was suffering from an insufficiency of cars, boilers, and generating machinery, and in addition the permanent way in some instances did not permit present rolling stock to be used to the best advantage. There was also a difficulty in obtaining labour in connection with the various parts of the undertaking. The exportation of rails from Great Britain having been stopped, inquiries had been made in other directions but without success. It was therefore impossible to duplicate the Island Bay line as had been intended this year.

PERSONAL.

Mr. F. W. Lacey, late borough surveyor of Bournemouth, left estate valued at £21,181.

Mr. F. P. Dolamore, assistant borough surveyor at Bournemouth, has been appointed to fill the vacant borough surveyorship caused by the death of Mr. F. W. Lacey. The salary is to be £550 per annum.

Mr. G. W. Watson, consulting engineer to the Commercial Motor Users' Association has for some time been appointed consulting engineer to the Munitions Mechanical Transport department of the Ministry of Munitions.

Sir Albert H. Stanley, managing director of the London Underground Railways and London General Omnibus Company, is the chairman of the new Motor Transport Committee recently established at the War Office.

Mr. Ralph W. Kennedy, who for the past eleven years has acted as Assistant Editor of "Electrical Industries, has been appointed chemical engineer in the Aeronautical Inspection Department of the War Office. Throughout his career Mr. Kennedy has been closely associated with scientific and technical work.

Major W. A. Vignoles, of the Lincolnshire Regiment, and borough electrical engineer of Grimsby, was wounded during the fighting early in July. Several fingers of his left hand were smashed.

Mr. W. H. Allen's resignation of the appointment of engineer and manager of Luton Corporation electricity undertaking has been accepted, subject to any action on the part of the Board of Trade or Minister of Munitions and also subject to the Council securing the services of a suitable successor.

Councillor G. H. Walker, of Stalybridge, whose death is announced, was a partner in the firm of William Underwood and Brother, contractors, Dukinfield. The firm constructed a number of tramways and many other public works during the past twenty years.

CONTRACTS AND ORDERS.

Ilford Council are paying 28s. 5d. per ton for 500 tons of Welsh coal for the electricity works.

Manchester Tramways Committee have placed a contract with Messrs. John Smith and Co. for a supply of steam coal.

Glasgow Tramways Committee have accepted the offer of P. and W. MacLellan, Ltd., for a three months' supply of iron and steel bars.

Northampton Tramways Committee have placed an order with G. W. Souster and Son for the renewal of the woodwork of the cooling tower, at £389.

Rotherham Council have placed an order with Messrs. Steel, Peech and Tozer, Ltd., for forty tons of rails at £16 10s. per ton, in order to construct a double track in a portion of Westgate.

Sheffield Tramways Committee have approved of an offer received from Hadfield's, Ltd., for the renewal of the tramway junction at Fitzalan Square.

Herbert Morris, Ltd., have received an order from Birmingham Electricity Committee for an overhead electric runway, including a travelling electric pulley-block and bogey trolley, at £421.

Willans and Robinson, Ltd., Rugby, have received a contract to supply to Wolverhampton Corporation a 5,000 kw. Zoelly turbine, with Siemens generator, Rees Roturbo pumps and Willans surface-condensing plant.

Luton Council have awarded contracts as subjoined:—Two boilers and stokers complete, £7,648, Clarke-Chapman and Co.; economiser, £1,091, E. Green and Sons; coal-weighing machines, £440, W. T. Avery, Ltd.; one water softener, £455, Harris Anderson Patent Feed Water Filter Co.; rotary feed pump, £258, Hayward, Tyler and Co.

Manchester Electricity Committee have placed the following contracts:—Coal stacker, supplied with 420-volt, a.c., three-phase motor, Fraser and Chalmers, Ltd.; three electric capstans, Sir W. G. Armstrong, Whitworth and Co., Ltd.; scrap cable and copper, B.I. and Helsby Cables, Ltd.; Cables, Pirelli-General Cable Works, Ltd.; Western Electric Co., Ltd.; W. T. Glover and Co., Ltd.; Callender's Cable and Construction Co., Ltd.; British Insulated and Helsby Cables, Ltd.; Chas. Macintosh and Co., Ltd.

FINANCIAL REPORTS AND MEETINGS.

The Bank Rate was raised on Thursday from 5 per cent.—at which it had stood since August 8, 1914—to 6 per cent. The advance had been anticipated for some days, but there was evidently some difference of opinion at the Bank Court, as the session lasted longer than usual. London clearing bankers have in consequence advanced their deposit rates by ½ per cent., and the discount houses and bill brokers now allow ½ per cent. more for money at call and notice. Prices of stock have generally somewhat receded. It is a remarkable testimony to British finance that it has been practicable to keep the rate of 5 per cent. for nearly two years.

Dublin Tramways and the Rebellion.—It will be interesting to learn whether the Dublin United Tramways Company will receive compensation for the damage sustained by their cars and for loss of receipts during the Sinn Fein outbreak. The interim dividend on ordinary shares for the first half of the current year is at the rate of 5 per cent. per annum, a reduction of 1 per cent., the traffic receipts falling by over £13,000 owing to the suspension of the services.

Prudent Finance at Coventry.—The Corporation have adopted the Tramways Committee's recommendation that the balance at their disposal of £5,091 on the past year's working be applied as follows:—£4,000 to the reserve or renewals fund; £1,091 carried forward. The vice-chairman of the Committee stated that in the near future they were committed to an expenditure for track replacements and equipment, and they thought the wisest course was to conserve the finances up to the last penny.

Edison Accumulators, Ltd.—At the second annual meeting on June 22, Lord Montagu of Beaulieu (the chairman) said that, considering the period of war stress, the profit of £7,398 on the year's trading was satisfactory. From that sum there had to be deducted the loss of £1,669 on the first year's working. A large amount of abnormal business had arisen in consequence of the war, such as vehicles required in connection with munition and Government contract work, but normal business had been held back. Owing to the need for additional capital to meet developments, the directors had decided not to recommend payment of a dividend.

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TRAMWAY TRACK CONSTRUCTION
AND
MAINTENANCE
BY
R. BICKERSTAFFE HOLT,
HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

SOME PRESS OPINIONS:

"The volume is bound to be of the greatest possible value to permanent way engineers."—*Glasgow Herald.*

"The various chapters cover almost every possible phase of tramway track engineering."—*Railway News.*

"The book throughout bears the stamp of close practical experience with all branches of the subject."—*The Iron and Coal Trades Review.*

"The book ought to prove valuable to the younger managers and a good work of reference to the older school."—*Cassiers Engineering Monthly.*

"To all engaged upon track construction and even to those engaged in road engineering we can strongly recommend this work."—*The Surveyor.*

"Those who wish to discuss 'What's wrong with the Track?' will find Mr. Holt's views and suggestions indispensable to their researches."—*Electrical Times.*

"A timely volume. The author has given the results of his experience in a form accessible to all. The book is handsomely got up and is well illustrated."—*Manchester Courier.*

"It is a thoroughly practical book. Mr. Holt has confined himself to really important matters and has written on them with the authority that comes of practical scientific experience."—*Yorkshire Post.*

"The book which throughout is essentially practical rather than academic, leaves upon the mind the impression of a thoughtful and helpful contribution to the knowledge of engineers engaged upon track work."—*The Electrician.*

"Mr. Holt has the gift of clear exposition in a degree to which few engineers can lay claim. His book is mainly intended for tramway engineers and we can assure that gentle band of controversialists that they will find enough in it to keep them happy for a long time."—*Electrical Industries.*

"One reason why Mr. Holt's book is of special value is that it is the work of one who has learnt in the school of experience. He has brought to a difficult and complex subject the observations of an excellent training and experience. The book has been produced in excellent type and form, and should find an immediate place in the offices of all concerned with tramways management."—*Municipal Journal.*

"This practical treatise on the construction and maintenance of street railway track presents in a comprehensive manner the difficult problems which the engineering department encounters. While the book deals with conditions as they exist on English tramways, there are enough points in common with those found on American street railways to make the book a valuable addition to the library of any engineer interested in track and roadway problems."—*Electric Traction* (Chicago, U.S.A.)

"It is not often that one who has studied and practised such an important work as tramway track construction can manage to spare time to write down the results of his experience, and if he does so he often fails to make himself understood by all. This, however, Mr. Holt has succeeded in doing by his lucid expositions. The lessons he teaches can be learnt by everyone who reads his book with care and attention. In doing this the student will be helped by clear type and by excellent reproductions of photographs and drawings. . . . There are many points common to all permanent way and railwaymen can learn a good deal by Mr. Holt's treatment of them."—*The Railway Gazette.*

"Tramway Track Construction is in many respects special and peculiar. . . . There is, therefore, ample room and justification for a book which describes methods that have been found satisfactory and gives a reasoned, consecutive account of the work, including the important question of maintenance. . . . The author has recorded the results of his experience with clearness and sincerity and a fullness of reasons for his practice and advice that is somewhat rare in technical books of this kind, and will be found refreshing and convincing, that is, in the sense that the reason behind the views expressed is always in evidence. . . . In conclusion we may say that while this book is a valuable and very fairly complete exposition of tramway track construction in town streets, it does not deal with the important differences that occur in work on country roads, where mixtures of tramway and light railway methods apply. This is no discredit to the author, who has confined himself to the conditions of his own experience."—*The Electrical Review.*

"This book contains a wealth of information concerning construction and maintenance methods employed by English tramway engineers. While English track construction differs materially from American standards from a design standpoint, the care exercised by English tramway engineers during the construction and maintenance periods will be a revelation to American engineers. . . . . In reality this work is a book of instruction on track construction and maintenance, being basicly practical, and doubtless it is the most authoritative contribution on the subject of English tramway tracks that has yet been published. . . . The value of the volume is enhanced by over 150 illustrations carefully selected to illustrate the methods and practices described by the author."—*Electric Railway Journal* (New York).

"This work is sure to become a classic book of reference to all who wish to have a really practical and intelligent knowledge of the subject of which it treats. . . . It has been said that an infinite capacity for taking pains amounts to genius—the author can fairly lay claim to that high position, for it is only by the exercise of such a capacity that he has been able to build up the splendid system of highways and tramways with which Leeds has now been endowed. . . . Unlike many writers of technical books, the author is capable of putting himself in the place of his readers and consequently of so propounding his theses that they can be understanded of all. . . . Our remarks will give some idea, we hope, of the care with which Mr. Holt has collected the materials for his book and the skill with which he has marshalled them."—*Indian and Eastern Engineer* (Calcutta).

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THE

Tramway & Railway World

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."

Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

SOUTH INDIAN RAILWAY COMPANY.

The South Indian Railway Company, Limited, are prepared to receive tenders for the supply of:—

1. Steel tires for locomotives and rolling-stock.
2. Locomotive duplicate parts.

Specifications and forms of tender may be obtained at the Company's offices.

Tenders, addressed to the Chairman and Directors of the South Indian Railway Company, Ltd., marked "Tender for Steel tires for Locomotives and Rolling-stock," or as the case may be, must be left at the offices of the Company not later than one o'clock on Wednesday, August 2, 1916.

The Company is not bound to accept the lowest or any tender.

A charge, which will not be returned, will be made of 20s. for each copy of Specification No. 1, and 10s. for each copy of Specification No. 2.

Copies of the drawings may be obtained on payment at the office of Robert White, Esq., M.Inst.C.E., Consulting Engineer to the Company, 3, Victoria Street, S.W.

91, York Street, Westminster, S.W.
July 18, 1916.

CITY OF ABERDEEN.

TRAMWAY DEPARTMENT.

UNIFORM CLOTHING FOR TRAMWAY EMPLOYEES.

The Corporation of Aberdeen are prepared to receive tenders for the supply of Uniform Clothing and Caps for inspectors, motormen, conductors, and parcel boys.

Forms of tender may be had on application to the undersigned at the Tramways Office, Municipal Buildings, Aberdeen.

Tenders must be made on the forms provided, and must be handed in not later than twelve o'clock noon on Tuesday, August 1, 1916.

The Corporation do not bind themselves to accept the lowest or any tender.

The contractors will be required to pay not less than the standard rate of wages relating to the particular trades to which the specification applies.

Corporation Tramways Office, Municipal Buildings, Aberdeen.
July 18, 1916.

R. STUART PILCHER, General Manager.

GREAT NORTHERN RAILWAY COMPANY (IRELAND).

The Great Northern Railway Company (Ireland) are prepared to receive tenders for one hundred and fifty pairs of Wagon Wheels and Axles.

Copies of the specification, drawings and form of tender may be obtained on application to the Secretary at Amiens Street Terminus, Dublin, on payment of a fee of 10s., which will be refunded on receipt of a bona fide tender and the return of the drawings.

Tenders, under cover marked "Tender for Wagon Wheels and Axles," should be delivered to the undersigned not later than 10 a.m. on Monday, August 14, 1916.

The directors do not bind themselves to accept the lowest or any tender.

T. MORRISON, Secretary.

Secretary's Office, Amiens Street Terminus, Dublin.
July 14, 1916.

VICTORIAN STATE RAILWAYS.

The Government of the State of Victoria, Australia, invites tenders for the supply and delivery of Locomotive engine, tender, carriage and wagon tires in such quantities as may be ordered during:—

Contract No. 29,969.

(a) The year ending June 30, 1917.
(b) The two years ending June 30, 1918.
(c) The three years ending June 30, 1919.

Specifications, conditions of contract and forms of tender may be obtained at the offices of the Consulting Engineers, John Coates and Co., Ltd., 115, Victoria Street, Westminster, London, S.W.

Tenders must be addressed, "Secretary for Victorian Railways, Melbourne, Australia," marked "Tender for Tires—A," "A.A.," and "A.A.A." respectively, and mailed in time to reach Melbourne on or before 11 a.m. on Wednesday, September 27, 1916.

A preliminary deposit of £100 must accompany each tender.

The Government of Victoria does not bind itself to accept the lowest or any tender.

(Signed) PETER McBRIDE,
Agent-General for Victoria.

POSITIONS VACANT.

CITYO F BIRMINGHAM.

ELECTRIC SUPPLY DEPARTMENT.

SENIOR SHIFT ENGINEER.

Applications are invited for the position of Senior Shift Engineer, required for the new temporary station, Nechells. The appointment will be permanent.

Applicants must have had a sound mechanical and electrical engineering training, and must have had previous experience in a large extra-high tension three-phase power-house.

The commencing salary will be £130 per annum, rising at the discretion of the Committee to a maximum of £200 per annum (plus £10 per annum during the war).

Applications (made on forms which can be obtained from the Secretary of the Electric Supply Department) accompanied by not more than three testimonials as to experience, ability and character, must reach the undersigned not later than July 29, 1916.

R. A. CHATTOCK,
City Electrical Engineer and Manager.

Electric Supply Department,
14, Dale End, Birmingham.
July 14, 1916.

GOVERNMENT OF TASMANIA.

The Hydro-electric Department of the above Government invite applications from qualified electrical engineers for the position o Chief Assistant to the Department.

Applicants must have extensive experience in the design, construction, and operation of E.H.T. plants and transmission, and in the commercial public supply of electricity, preference being given to applicants having experience on hydro-electric service.

Salary £550 per annum, payable in Hobart, with a three years' engagement and first-class return passage.

Applications, stating age and qualifications, and enclosing not more than three recent testimonials, to be forwarded to the Agent-General for Tasmania, 56, Victoria Street, S.W., not later than July 25.

The Department's present plant is of 7,500 kw. capacity, hydraulic fall 1,000 feet, transmission 88,000 volts 64 miles.

JUNIOR ASSISTANT ENGINEER.

Junior Assistant Engineer, ineligible for military service, required immediately for shift work in alternating current single-phase H.T. station; wages, 38s. per week, plus war bonus of 2s. per week. Applications, giving particulars of experience and age, with copies of testimonials, to Chief Engineer, Electricity Works, Corporation of Wimbledon.

TRAMWAY LINESMAN.

Tramway linesman. Capable of doing all repairs to overhead equipment. Reply in writing, stating wages required. Electricity Works, Bootle, Lancs.

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LONDON TRAMWAY ACCOUNTS.

At the meeting of the London County Council on Tuesday, the Highways Committee submitted the tramway accounts for the year ended March 31, 1916, together with the report of the chief officer of tramways on the working of the undertaking. The tramways extend over a total length of 150¼ street miles (144¼ miles of electric lines and 5¾ miles of horse lines). The whole is worked by the Council with the exception of 2¼ miles in Harrow Road, which are worked by the Metropolitan Electric Tramways, Ltd. The total income and working expenses were given in the following table, to which we have added the corresponding figures for the two previous years:—

	1915–16.	1914–15.	1913–14.
	£	£	£
Income	2,339,291	2,399,847	2,268,669
Working expenses	*1,683,660	†1,700,572	1,615,467
Surplus on working	655,631	699,275	653,202
Deductions—	£	£	£
Interest	326,477	330,300	—
Redemption	425,908	405,605	—
	752,385	735,905	736,598
Rent drawbacks, etc.	6,797	1	—
Income tax	40,000	32,102	28,197
Parliamentary expenses	2,261	2,803	2,086
	801,442	770,811	766,881
Less—Tax retained, interest on balances, rent, etc.	72,016	38,363	25,153
	£729,426	£732,448	£741,728
Deficiency (met from General reserve)	£73,795	£33,173	£88,526

* Including war service allowances of £95,365.
† " " " " " £42,209.

The renewals fund amounted on March 31 to £329,968. There has been no payment into this fund since the year 1912–13. The general reserve fund on March 31, after meeting the deficiency on the year's working, amounted to £70,119. In the case of both funds the balances take no account of the depreciation of investments, which on present prices amounts to about 20 per cent. The total operating expenses, excluding war service allowances amounting to £95,304, were £1,588,205. The total number of passengers during the year was 545,423,397; the number of car miles was 47,879,075. The corresponding figures for 1914–15 were 550,497,993 and 58,978,792. In considering the results, the Highways Committee observe that it must be borne in mind that the strike, involving the disorganisation of the service and a consequent loss amounting to over £100,000, occurred in the second month of the financial year. Further, there is a special charge of £10,000 for the removal of the old horse lines in Liverpool Road. As the estimates for 1915–16 contemplated a deficit of £91,614, and this figure took no account of the loss of about £100,000 due to the strike, the actual results, which show a deficit of £73,795, are better than might have been expected. War conditions have seriously increased the working cost, but on the other hand some advantages have accrued through the relaxations of restrictions as to overcrowding. The capital expenditure up to March 31 amounted to £13,516,577, of which £200,854 represents the expenditure during the year 1915–16. The net debt on March 31 was £9,580,901, including £971,878 in respect of the horse tramways now obsolete. The sum paid as rates on the permanent way amounted to £82,927. This represents an average relief to the rates of London of about ½d. in the £. The savings of the road authorities in consequence of the Council maintaining the paving along the tramway routes is estimated at £140,000 a year. The expenditure incurred in the maintenance of the tracks during 1915–16 was .52d. per car mile. The amount paid for street widenings and the estimated savingto local authorities on maintenance of paving gives a total of £238,469.

FINANCE COMMITTEE'S REPORT.

The Finance Committee report that they approve the accounts of the tramway undertaking. These show that the net expenditure amounted to £200,854 and the total debt incurred up to March 31, 1916, was £13,030,660. The debt outstanding at the same date was £9,701,208. This debt included £971,878 in respect of capital expenditure on horse traction which had been rendered obsolete and has still to be provided for. The total revenue receipts for the year amounted to £2,339,291, a decrease of £60,555. The surplus on working was £655,631. The charges to be met are as follows:—Interest, £326,477; repayment of debt, £425,908 (less deductions amounting to £23,959) or a total of £729,426. These charges thus exceed the surplus on working by £73,795. This figure is, however, less than the original estimated deficiency for the year, which was £91,614. No payment has been made to the renewals fund in respect of the car mileage run, which was some years ago fixed at 1½d. per car mile. The expenditure for renewals of track and equipment amounted to £73,355, leaving a balance in the fund on March 31 of £329,968. This is invested in securities, and taken at current quotations these investments would stand at £274,654. The net deficiency for 1915–16 of £73,795 has been met by a transfer from the general reserve fund, which was reduced on March 31, to a balance of £70,119. Commenting on the position, the Finance Committee remarked that the condition of the undertaking causes them no little anxiety.

ANNUAL ESTIMATES, 1916–17.

The Highways Committee submitted the annual estimates for the year 1916–17, of which the following is a summary:—

Surplus on working		£955,355
Interest on bank balances and sundry rents		19,110
		£974,465
Deductions—		
Debt charges (repayment of capital, £429,851; interest, £313,273)	£743,124	
Income tax and sundry items	5,433	£748,557
Net estimated deficiency		£74,092

The reserve fund will be used to meet the estimated deficiency. The estimates contain provision of £20,000 for contingencies, and £122,500 for allowances to officers and employees on war service, but it is probable that this figure will prove insufficient, as the estimates were prepared before the introduction of the second Military Service Bill. But for these two special items of charge, the results of working the tramways for the year would show an estimated surplus of £68,408. The receipts are estimated at 11.50d. per car mile as compared with 11.42d. earned in 1915–16. The estimates include no sum for addition to the renewals fund, and this fund and the general reserve fund will be more than absorbed if the estimated deficiency is realised. The Committee remark that they view with no little anxiety the probable continuation of the deficit, but they point out that in many directions the undertaking is being worked under abnormal and adverse conditions arising out of the war. In 1915–16 the electric car mileage was 47,867,176. The estimated mileage for the current year is 50,000,000.

SIR JOHN BENN contended there was no justification for predicting that the tramways would become a charge on the rates. The undertaking was handicapped by all sorts of charges. They had paid in a year £400,000 for sinking fund, £230,000 to local rates, £100,000 through the strike and £125,000 for special war charges and allowances to staff, together with extra thousands of pounds for coal. The national service which the undertaking was rendering at this critical period was immense, and ought to be taken into account when the financial position was being considered.

SIR GEORGE GOLDIE (chairman of the Finance Committee) denied the suggestion that he or his committee were unfriendly to the tramways. His anxiety was tomaintain their reputation, and he quoted from his budget statement the opinion that the tramways could not be judged by results obtained in war conditions and that their present position was not to be regarded as permanent. When the report was before the Highways Committee there was not a dissentient voice as to reporting the possibility that before long they would have to make a call on the rates. He pointed to the depletion of the renewals and reserve funds, and described the losses as very serious.

MR. H. WARD referred to omnibus competition, and complained that the tramways had to spend £120,000 a year in maintaining the track worn out by their competitors. If their working costs had gone up, their receipts had gone up even more, although car mileage had gone down because of shortage of staff.

MR. J. D. GILBERT, M.P., compared the Traffic Combine earnings with those of the tramways, who, burdened as they are, really paid 8 per cent. on capital expended, against only 4½ per cent. by associated London traffic companies. He suggested the appointment of traffic managers for particular areas. He believed that the Council did not get all that it could out of the system.

COL. KARSLAKE severely criticised the failure of the position of the renewals fund. The House of Commons Committee put it at a penny a mile; the Council agreed to two-thirds of a penny to meet the natural wastage. Since 1912–13 they had not put by anything except £400 to pay bills for renewals which inevitably would come due.

MR. H. H. GORDON reminded the Council that in the last four years they had repaid two millions of debt on the tramways. This in the commercial world would be taken as equivalent to provision for depreciation. London would always require tramways; the omnibuses could not carry the passengers. Cheap transit in London was a valuable asset, and must be maintained, and he hoped that when the war was over the undertaking would be relieved of some of the burdens which ought never to have been placed upon it.

The reports were then received and various estimates approved.

OVERHEAD TROLLEY RISKS.

Apropos of an article in last week's issue on the above subject, it is interesting to record that one London manager has taken steps to guard against accidents from trolley arms and wires on cars not fitted with top covers. On a car belonging to the South Metropolitan Tramways and Lighting Company, Ltd., there is to be seen near each canopy an arched overhead rail. This device, which is earthed, is likely to afford protection to top deck passengers in the event of the trolley arm or the wire falling. Its efficacy has been proved in cases in which the boom is carelessly turned by conductors, when passengers' hats would be struck but for the presence of the hoops. Each hoop also serves to suspend a lamp to light the staircase. On no undertaking around London does it appear to have been found desirable to adopt a loop of material more substantial than rope for the secondary connection between the trolley-wheel and the arm. In one case, however, there is a double thickness of rope, bound together at its extremities. The objection to any stronger material seems to be the danger of bringing down the trolley wire in the event of the arm becoming displaced and colliding with the overhead equipment.

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ALTERATION OF FARES.

Keighley Council have agreed to a recommendation by the Tramways Committee to discontinue halfpenny fares on the tramways. In their place the Committee proposed to issue prepaid tickets in books of nine for 6*d.* and eighteen for 1*s.*, and that a uniform fare of one penny for any distance between any two termini be charged when a prepaid ticket is not presented. The prepaid ticket will not be available on Sundays or after two o'clock on Saturdays. As the result of discussion by the Council, Councillor A. Smith, chairman of the Committee, agreed to issue twenty tickets for 1*s.* and five for 3*d.* He stated that halfpenny fares had been in operation for four years, and although for the past year the undertaking had earned £200 more than in any other year, the increased working costs entailed by the war had created a deficit during the past two years. In 1911-12 the operating cost per mile was 5*d.*; for the past year it was 7*d.* Money was needed to carry out necessary improvements, and the only way to raise it was by increasing the fares.

In order to provide for future repairs and renewals, Kirkcaldy Tramways Committee recommended the Council to dispense with halfpenny fares except on workmen's cars.

Rawtenstall Corporation have asked Bacup Council to agree to increases of fares in the latter district, in order to improve the receipts. The Bacup authority have decided to consider modifications in the stages only, and have stated that Rawtenstall must ask the Board of Trade to appoint an arbitrator if their proposals are insisted upon.

Bradford Tramways Committee have reaffirmed their resolution with regard to fare stages, with an instruction "that a scheme be submitted within three months after the declaration of peace to readjust the inequalities of tramway fare stages in certain districts." Mr. C. F. Spencer, the general manager, had reported against any extension of penny stages under present conditions, while agreeing that under normal circumstances the proposal was in the right direction.

West Ham, Leyton, and Walthamstow Councils having abolished halfpenny fares in order to meet the increased cost of working, have asked the London County Council to withdraw the halfpenny fares on the portion of through-running routes in their area. The universal penny fare has been adopted in West Ham and Leyton, and Mr. J. S. D. Moffet, general manager at West Ham, in his letter to the County Council, states: "If your Council are at all favourable to such an alteration, the opportunity presents itself for arriving at a uniform-fare scheme for practically the whole of the tramways in the eastern portion of the Metropolitan area."

Adverting to the increased fares at Gloucester a local writer states that the public are paying without complaint. He adds that "even at the increased fares the public are given excellent value."

APPLICATIONS TO TRIBUNALS.

Women drivers for tramcars are unobtainable for the one suitable route of the Stalybridge, Hyde, Mossley and Dukinfield joint Tramways and Electricity Board. This information was given to the local tribunal by Mr. R. Blackmore, the chief engineer, who stated that owing to the reduction in the number of employees only a winter service was being run. That was being done with the aid of the car-shed men. Conditional exemption was allowed for twenty-three men—motormen, fitters, machine drillers and repairers.

At Gosport Mr. J. Fereday Glenn, resident manager of the Gosport and Fareham Tramways Company, applied on behalf of twenty seven men. The court took each case individually and granted three months' extension in six cases, one month in another case, and conditional exemption for all the others, except one man, who was refused.

A Hull motorman asked for total exemption on conscientious grounds, but he was ordered to undertake non-combatant service.

Conditional exemption was given at Chatham to twenty-eight employees of the Chatham and District Light Railways Company, following a consultation between the local military representative and Mr. Jensen, the general manager.

Middleton Electric Traction Company, Ltd., were given conditional exemption for their chief storekeeper and cashier.

The Imperial Tramways Company at Stockton-on-Tees were given exemption for their cashier.

ANNUAL STATEMENT OF TRADE.

Certain alterations in classification, recommended by the British Electrical and Allied Manufacturers' Association to the Board of Trade in 1914, will appear in the issue of the annual statement of trade of the United Kingdom covering 1915, which, it is anticipated, will be shortly issued. The new classification will be as follows:—

IMPORT LIST.

Electrical goods and apparatus, etc.—Meters and measuring instruments, Switchboards, and Unenumerated.

Machinery and parts thereof (Electrical).—Generators and motors (except for aeroplanes, motor-cars and motor-cycles) and Unenumerated.

EXPORT LIST.

Electrical goods and apparatus, etc.—Meters and measuring instruments, transformers, switchboards, and unenumerated.

Machinery and parts thereof.—Prime movers (except electrical). Other kinds:—Steam reciprocating engines, Steam-turbine engines, Internal-combustion engines (except for aeroplanes, motor-cars and motor-cycles), and Unenumerated. Electrical:—Railway and tramway motors, Other generators and motors (except for aeroplanes, motor-cars and motor-cycles), and Unenumerated.

COMMERCIAL POLICY AFTER THE WAR.

The Prime Minister has appointed a Committee to consider the commercial and industrial policy to be adopted after the war, with special reference to the conclusions reached at the Economic Conference of the Allies, and to the following questions:—

(a) What industries are essential to the future safety of the nation, and what steps should be taken to maintain or establish them.
(b) What steps should be taken to recover home trade lost during the war, and to secure new markets.
(c) To what extent, and by what means, the resources of the Empire should and can be developed.
(d) To what extent, and by what means, sources of supply within the Empire can be prevented from falling under foreign control.

The Committee will be composed as follows:—Lord Balfour of Burleigh, chairman; Mr. Arthur Balfour, Mr. H. Gosling, Mr. W. A. S. Hewins, M.P., Mr. A. H. Illingworth, M.P., Sir J. P. Maclay, Bart., Sir A. Mond, Bart., M.P., Mr. A. Pease, Mr. R. E. Prothero, M.P., Sir F. H. Smith, Bart., and Mr. G. J. Wardle, M.P., together with the following gentlemen who are presiding over the Board of Trade Committees on the position of important industries after the war:—Sir H. Birchenough, Lord Faringdon, Sir C. G. Hyde, Sir C. A. Parsons, Lord Rhondda, Mr. G. S. Smith. Mr. P. Ashby (of the Board of Trade) and Mr. G. C. Upcott (of the Treasury) have been appointed secretaries to the Committee.

MISCELLANEOUS NEWS AND NOTES.

Seats for Women Conductors.—We understand that a number of tramways are considering the introduction of seats for women conductors, and are making experiments with this end in view. As mentioned among the contracts this week, Northampton Corporation tramways have recently placed a large order for conductors' seats.

A Concession to Controlled Firms.—The Chancellor of the Exchequer amended the Finance Bill by accepting a clause based on the arrangement made by the Munitions Department that, having regard to the special circumstances of the controlled firms, they should be allowed to write down the cost of their new buildings and plant to the post-war value. That would apply both in respect of the excess profits duty and the income-tax.

Halifax and Expert Advice.—A sub-committee of Halifax Tramways Committee has been appointed to consider the question of an arrangement with Hebden Bridge Council for a renewal of running powers in the district. Authority has been given to the sub-committee to obtain any expert advice or assistance they may require. One matter in dispute is the refusal of the Corporation to extend the tramways from Hebden Bridge to Whiteley Arches.

Electric Tramway Project for Edinburgh.—An interim report, prepared by the three experts engaged by Edinburgh City Council, states that it is possible to have electric cars ready to run throughout the city at midnight on June 30, 1919, when the tramway lease ends. The report states that the closing negotiations with the company and the city's arrangements for the new system are distinct matters. In regard to the latter the Corporation will be able to instal electricity without interfering with the cable cars, and without the assistance of the company. The report came before the Tramways Committee on July 19.

Enlisted Employees and Wages' Increases.—By sixteen votes to ten Cardiff Corporation have decided that increases of salary or wages, except in cases where an increase was granted on a date when the employee was actually in the civil employ of the Corporation, shall apply as and from July 10, 1916, only to those employees actually engaged in carrying out their civil duties, and not to those on military service. Sir John Courtes, chairman of the Tramways Committee, in seconding the motion, said he would not be a party to anything that would do an injustice to those who had gone out to do service for their country, but, speaking of the tramway employees, he could say that their dependents were better off than they were before the war.

Suggested Keighley-Bradford Linking and Goods Traffic.—Mr. H. Webber, general manager, Keighley Corporation Tramways, in his annual report says: "It would appear that there is a prospect that the short distance existing between the Stockbridge terminus and the Bradford tramway terminus at Crossflats will be stepped over in the near future. Such a linking up with Bradford would, in my opinion, have a very beneficial effect on the Keighley tramway undertaking. The amount of goods traffic taken from Keighley to Bradford by road is developing every year, and it seems to be a legitimate field for the tramway undertaking to handle such traffic, and thus reduce the number of private vehicles of all descriptions, which would have a direct saving on the wear and tear of the roads."

Cardiff Manager's Praise of Women Drivers.—Mr. A. Ellis, general manager, reported to Cardiff Tramways Committee, on July 14, that the Tramway and Vehicle Workers' Union had complained to the Chief Industrial Commissioner of the danger of employing women as car drivers. Eight women were so employed, and more would have to be engaged if every available man was to be released. Male drivers over twenty-five years of age were exempt. There were 128 women drivers on the Glasgow cars, and on several other tramways women had been trained as drivers, but in no other case had a complaint been made. In Cardiff they were driving as well and as safely as most men. The Committee endorsed the manager's views, and asked the chairman (Sir John Courtis) and the manager to see Sir George Askwith on the matter.

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Employees Exempt from Military Service.—In a revised list of certified occupations, it is provided that all classes of workmen, single or married, employed in electrical generating stations, are exempt from military service, irrespective of age. On tramways, the traffic inspector, chief storekeeper, parcel superintendent, and drivers, are exempt if over thirty years of age and single, but the age limit does not apply to married men. Electricians or electrical fitters engaged in the maintenance or repair of motors and other electrical plant in factories are exempt over thirty years of age and single, all married men, irrespective of age, coming within the reservation. The regulations issued with the list state that the military representative may ask the tribunal to consider whether it is necessary to retain a man in civil employment.

Employees' Demands.—Wallasey tramway employees threatened to strike on July 15 unless their demand for increased wages was conceded. They were informed that an increased scale of pay had been arranged and was awaiting the approval of the Wages Board, after consultation with Birkenhead, it being desired to secure uniformity. A notice was posted at the depôt warning them that by striking they would commit an offence under the Munitions of War Act. Two days later the men decided to remain at work and ask the Wages Board to receive a deputation. Cardiff employees have protested against the action of the Tramways Committee in declining to meet representatives to discuss an application submitted on March 8, and also the question of female drivers, expressing astonishment at the recommendation of one farthing an hour advance to male drivers and conductors and the exclusion of females and males under twenty-one, and demanding that the Committee shall meet the employees' representatives. Blackburn Tramways Committee have granted an increase of a halfpenny an hour to their employees.

PERSONAL.

2nd Lieutenant J. Austin Baker has recently been promoted to the rank of Lieutenant and has been appointed to carry out workshop duties with the Welsh division in France. Mr. Baker, before enlisting in the Army Service Corps in January, 1915, as a lorry driver, was in the traction department of the British Westinghouse Company, Manchester, and for some years was assistant rolling stock superintendent of West Ham Corporation Tramways.

Mr. G. W. Shepherd, who on account of ill health recently resigned the position of general manager of the Edinburgh and District Tramways Company, which he had held since 1906, and was appointed secretary, has now resigned that position. Mr. John Wiseman, who has been associated with the Company for over thirty years, has been appointed secretary. Mr. Shepherd has had many difficulties to contend with during his management and has shown himself to be possessed of resource and energy.

CONTRACTS AND ORDERS.

Birkenhead Council have agreed to purchase a Daimler petrol motor tower wagon for the tramways department, at £820.

Northampton Corporation Tramways have ordered a large number of seats for women conductors from the Equipment and Engineering Company, of 2, Norfolk Street, London, W.C.

Pinchin, Johnson and Company, Ltd., of Bevis Marks, E.C., have been awarded a contract by the London County Council for insulating varnishes, etc. required for the tramways.

Leyland Motors Ltd. have received an order from the London County Council for two motor fire engines, at £887 each. A sum of £40 has been added by the Fire Brigade Committee, in respect of contingencies.

Bristol Council have accepted the tender of Fraser and Chalmers, of Erith, to supply a 3,000-kw. Fraser and Chalmers turbine, coupled to a Vickers alternator, and with condensing plant by the British Westinghouse Company.

The British Westinghouse Electric and Manufacturing Company, Ltd., have been given the contract for the supply of choke coils, etc., for turbo-generators at Greenwich generating station, and this contract has been made in addition to certain temperature alarms which were ordered to complete the installation.

H. Bessemer and Company, Ltd., have a contract from the London County Council for 500 driving-wheel tires, at £38 10s. a ton, and 250 pony-wheel tires, at £55 10s. a ton, less two and a half per cent. discount. These prices were for tires not tested to specification. The prices, inclusive of tests, were £40 and £57 a ton, less two and a half per cent. respectively, and as the tests are considered essential, the latter prices were accepted.

FINANCIAL REPORTS AND MEETINGS.

Liverpool Overhead Railway Company.—Dividends have been declared at the rate of five per cent. per annum on the preference stock, and two and a half per cent. per annum on the ordinary shares, income-tax being deducted at 4s. 6d. in the £.

Dividend Announcements.—Rio de Janeiro Tramway, Light, and Power Company, one and a quarter per cent.; Brazilian Traction, Light, and Power Company, one per cent. on the ordinary stock; San Paulo Tramway, Light, and Power Company, two and a half per cent. on the common stock.

L.C.C. Tramway Receipts.—The traffic receipts for the two weeks ended July 5, 1916, were £98,617, an increase of £6,786 as compared with the corresponding period last year. The number of passengers was 23,373,410, an increase of 1,774,626. From April 1 to July 5 (thirteen and a half weeks), the total receipts were £657,523, an increase of £93,374 on the corresponding period of 1915. The route mileage was 141.67.

Glasgow Corporation Tramways.—Appended is a comparison of the chief figures in the reports for the three years ended May 31. Further details concerning the past year appeared in our issues of June 10 and 24.

	Year ended May 31.		
	1916	1915	1914
Capital expenditure ..	£3,835,156	£3,751,708	£3,675,317
Amount outstanding ..	£2,359,819	£2,411,868	£2,517,359
Traffic revenue	£1,149,264	£1,070,694	£1,078,691
Total revenue	£1,157,337	£1,076,878	£1,083,847
Working expenses	£693,005	£684,171	£676,277
Gross balance	£464,332	£392,707	£407,569
War allowances	£80,438	£51,817	—
Receipts due to Paisley Tramways	6,700	5,559	5,830
Income-tax	£39,854	£22,790	£14,056
Interest and sinking fund ..	£200,088	£184,289	£185,528
Depreciation fund	£105,725	£104,082	£127,204
Perm'n't way renewals fund	£68,681	£68,228	£85,438
Parliamentary expenses ..	£500	£8,818	£609
Net balance	£43,548	£12,951	£53,892
Car mileage	24,903,309	24,214,460	24,403,482
Passengers carried	362,371,464	336,260,758	336,654,624
Average fare per passenger ..	.761*d.*	.764*d.*	.769*d.*
Units per car mile	1.47	1.40	1.38
Power cost per car mile ..	.619*d.*	.515*d.*	.526*d.*
Traffic receipts per track mile	£11,571	£10,787	£10,976
Traffic receipts per car mile ..	11.05*d.*	10.61*d.*	10.609*d.*
Expenses per car mile ..	*6.658*d.*	*6.781*d.*	6.651*d.*
Ratio of working expenses ..	*55.95%	*59.87%	58.87%
Total track mileage	198	198	196
Number of cars in stock ..	857	857	852

*Excluding war allowances.

General Electric Company, Ltd.—The profits for the year ended March 31 amounted to £196,274 and £36,701 was brought forward. After deducting debenture interest and depreciation amounting to £27,259, a dividend of ten per cent. is declared on ordinary shares and six per cent. on preference shares, transferring to the reserve £40,000, granting to dependents of men on active service £12,961, and leaving to be carried forward £48,053. The report states that the works have been mainly employed in the production of war material. Some 1,500 experienced members of the staff and workpeople now serving at the Front had to be replaced by untrained substitutes, and new workshops erected for special work. If the present results were satisfactory, they were entirely due to the unselfish devotion, initiative, and unremitting energy of the staff and workpeople. The capital expenditure on new works at Witton during the year amounted to £70,000. The export business recorded very large inquiries, but owing to well-known causes common to all exporters at the present time only a small proportion of the demand could be filled. Mr. H. Hirst, presiding at the annual meeting on July 17 said that the advance shown in the report was all the more remarkable in view of the fact that a great portion of the previous year's output was for Government requirements, and the prices were almost without exception those ruling prior to the war; where advances had been asked for, they were in proportion to increased prices of material and labour. Increased profits were largely explained by more repetition work than could be expected in normal times. In some departments which showed annual pre-war loss there had been legitimate profits during the year under review. The shell factory laid down by the company was in full swing. The deliveries had given the greatest satisfaction, but in this section they had not yet succeeded in making a profit. This was no time to think of larger dividends; they must conserve their strength and keep their assets liquid. The stronger they made themselves internally the better they could wage the fierce commercial and industrial contest which was bound to follow the war. Through the Peel Conner Telephone Works, they had established a magneto factory at Coventry.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of forty-five of the principal tramway undertakings in the United Kingdom for the week ended July 8, give total receipts of £189,514, or £13,457 more than in the corresponding week of last year. The total length of track included in the returns was 2,252 miles, or seventy more than for the corresponding week. The receipts this year were at the rate of £84 3s. per mile of single track, and last year at the rate of £80 13s. 8d., thus showing an increase for the week of £3 9s. 4d. per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27, 1914	Cash. July 20.	A Week Ago.
5%	5%	Alabama Traction, 5% 1st. Mt.	—	67	69½	69½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4½	76/3	71/5
4%	4%	Do. 4% Deb. ...	100	91	74	74½
4½%	4½%	Do. 4½% Deb. ...	100	98½	75	74½
5%	5%	Do. 5% Deb. ...	100	96	77½	77½
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1⅝	19/9	19/9
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	96	96
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11½	10½	10½
4½%	4½%	Do. 4½% Deb....	100	96	83½	83½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	92	92
$1	$1	Brazilian Trac. & Power Ord. ...	$100	66	62½	63½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	94	94½
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6½	6½
2/6	2/6	Do. 5% Cum. Pref.	5	5	85/-	85/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92½	92½
3%	3%	Brit. Col. Elec. Ry. Def. Ord....	100	107	41	40
6%	5%	Do. Pref. Ord....	100	106	41	40½
5%	5%	Do. 5% Cum. Pref.	100	103	62xd	62xd
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	80½	80½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	65½	65½
—	—	Brit. Elec. Trac. Ord, ...	100	—	35	34½
—	—	Do. 6% Cum. Part Pref. ...	100	—	80½	80
5%	5%	Do. 5% Deb.	100	92	83½	83
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	70	71
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	92½	92½
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	6-7/8	128/3
1/3	1/3	City of B.A. Trams.	5	5½	93/1⅛	93/9
5/-	4/-	Dublin United Trys. 6% Pref.	10	12	11xd	11
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	—	2/1½	2/1½
5/6	6/-	Lanarkshire Trys. Co.	10	10½	9⅜	9⅜
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9d.	9d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	½	2/3	2/3
6d.	6d.	Do. 5% Pref.	1	⅛	9/1½	8/10½
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	5⅝	5⅝
4½%	4½%	L.G.O. 4½% 1st Deb.	100	88½	8⅝	8⅝
5%	5%	Do. 5% Inc. Deb.	100	88½	81	81
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	50	50
3/-	3/-	Madras Elec. 6% Pref. ...	5	5½	96/3	96/3
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67½	67½
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	70	70
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	79½	80½
$1½	$1½	Mexico Trams. Common ...	$100	70	27½	28
5%	5%	Do. 1 Mt. 5% G.B.	—	84	40½	41
6%	6%	Do. 6% Mt. Bds.	100	76	34½	34½
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	96½	96½
4½%	4½%	Do. 4½% Stg. Debs.	100	99	94½	94½
1/2*	1/2*	National Steam Car	1	½	18/9	16/3
9d.*	9d.*	New General Traction	1	¼	7/9	7/9
6d.	8½d.	Northern Gen. Trans. Ord. ...	1	⅝	18/-	16/-
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	66/-	66/-
5%	5%	Do. 5% 1st Deb.	100	89½	73½	70½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80½	83
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	½	10/10½	10/10½
8d.	10d.	Provincial Trams. Ord.	1	½	16/6	16/3
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84	84
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	91½	91
5%	5%	1st. Mt. 5% 50 yr.	100	89½	82	82
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	90½	90½
5%	5%	Do. 5% Perp. Deb.	100	99½	82	82
—	—	Singapore Elec. Trams	5/-	½	3/7½	3/7½
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	94½	94½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	85	85
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	92½	92½
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	78½	78
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	¾	9/3	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4½	90/-	90/-
		Metropolitan Dist. Ord. ...	100	21½	19½	19½
		Undgd. Elec. Rys. of London ...	10	2½	39/0½	39/4½
		Do. "A"	1/-	½	6/6	6/9
		Do. 4½% Bds of 1933 Rd.	—	99	102½	103½
		Do. 6% 1st Cum. In. Db.	100	114	106½	107
		Do. 6% In. Bonds Rd. ...	—	88	88½	90½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1915	Latest Return. 1916	Aggregate. Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	July 15	£49,999	£54,578	29	£1,432,316	— £2,927
Auckland.....(28 days)	June 2	20,511	21,152	48	253,058	+ 4,949
Ballarat and Bendigo ...	May 21	2,885	3,855	8	7,582	+ 777
Brazilian Traction Mlrs.	May	6,670,110	7,091,000	22	32,989,000	+1,896,830
Brisbane	Apr.	29,890	32,575	18	129,450	+ 12,610
British Columbia.....$	May	512,568	542,353	47	6,073,546	— 734,924
Buenos Aires Lacroze ...	June 12	40,421	36,213	52	490,818	— 15,324
Burmah Tramway ... Rs.	July 15	4.476	4,545	50	...	+ 5,472
Calcutta.....Rs.	,, 15	69,948	70,104	29	1,883,000	+ 88,042
Cape Town	June	...	12,920	...	...	...
Carthagena & Herrerias..	June	2,059	3,512	26	16,369	+ 5,721
Cordoba	May	14,494	14,868	9	28,921	+ 818
East India	June	2,194	2,283	48	23,160	+ 1,597
Hong Kong.....$	June 17	10,826	16,624	27	327,027	+ 73,522
Kalgoorlie	March	2,638	2,479	13	6,963	— 399
La Plata	June	3,875	3,735	26	25,925	+ 160
Lima	Apr.	31,633	33,556	18	134,629	+ 5,614
Lisbon .....Escu.	Apr.	...	190,051	18	712,651	...
Madras .....(2 weeks)	July 15	32,086	34,007	28	404,349	+ 29,428
Manila .....$	Apr.	117,450	124,350	...	505,381	+ 16,765
Manaos .....Rs.	May	...	152,854	...	...	...
Melbourne	Apr.	...	69,542	...	...	...
Montevideo	June	24,266	25,300	24	241,068	+ 14,376
Pernambuco	July 16	2,911	3,104	28½	83,193	— 5,599
Peruvian .....$	June	759,374	929,500	52	9,763,497	+1,403,792
Port Elizabeth	June	...	2,809	...	...	...
Rangoon	June	4,997	4,205	26	28,581	— 1,164
Shanghai .....$	June 19	26,314	29,017	...	...	...
Singapore .....$	June 10	11,569	13,189	23	284,326	+ 32,786
Toronto.....$	May	795,262	903,924	22	4,450,708	+ 428,203
Winnipeg	May	263,302	276,980	22	1,446,788	— 49,919

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Name.	Week ended	Latest Return. 1915	Latest Return. 1916	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Aggregate. Incr. or Dec.
Aberdare	July 11	£325	£384	+ 59	14	£5,590	+ £39
Aberdeen Corporation...	,, 12	1,783	1,840	+ 57	6	11,263	— 98
Accrington Corp.	,, 12	559	583	+ 24	15	8,692	+ 247
Ayr Corporation	,, 15	608	503	— 104	9	3,611	— 105
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	,, 16	1,438	1,531	+ 93	15½	23,037	+ 1,707
Birmingham Corp.	,, 15	13,828	16,615	+ 2,786	15	247,822	+ 44,070
Do. Motor Omnibuses	,, 15	692	1,028	+ 135	15	14,304	+ 1,431
Blackburn Corp.	,, 12	1,250	1,194	— 56	15½	19,920	— 579
Blackpool & Fleetwood.	,, 15	961	1,234	+ 273	23	16,239	+ 1,123
Blackpool Corp.	,, 13	1,699	2,231	+ 532	15	24,438	+ 3,337
Bolton Corporation	,, 16	2,868	2,788	— 80	16	44,344	+ 2,053
Bournemouth Corp.	,, 19	2,097	2,411	+ 314	16	35,174	+ 1,345
Bradford Corporation ...	,, 8	6,474	6,859	+ 385	14	96,260	...
Brighton Corporation ...	,, 16	1,186	1,273	+ 87	15½	17,892	+ 1,091
Bristol	,, 14	10,344	10,691	+ 347	28	270,580	+ 9,385
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	,, 15	1,569	1,587	+ 18	16	27,277	+ 931
Burton-on-Trent Corp...	,, 9	317	286	— 31	14	3,735	— 457
Bury Corporation.....	,, 16	1,366	1,383	+ 17	16½	22,390	+ 613
Cardiff Corporation.....	,, 8	2,820	3,074	+ 254	14	41,295	+ 2,175
Chatham & District.....	,, 13	1,336	1,343	+ 7	28	32,214	+ 1,167
Chesterfield Corp.	,, 6	261	287	+ 26	14	3,886	+ 137
Colne Corporation	,, 24	234	264	+ 30	...	...	...
Cork Electric	,, 13	540	542	+ 2	28	13,539	— 224
Croydon Corporation ...	Apr. 28	1,726	1,403	— 323	4	5,417	— 966
Derby Corporation	July 15	1,073	1,138	+ 65	15½	17,070	+ 726
Dover Corporation	,, 8	348	347	— 1	14	4,409	— 14
Dublin & Lucan	,, 14	164	186	+ 22	2	353	— 2
Dublin United	,, 14	6,310	6,629	+ 319	28	158,764	+ 8,967
Dundee City	,, 12	1,355	1,340	— 15	8½	11,438	+ 118
East Ham Corporation	,, 15	1,351	1,346	— 5	15½	20,108	— 112
Exeter Corporation.....	,, 14	403	403	nil	15	5,731	— 148
Glasgow Corporation	,, 15	21,452	22,493	+ 1,041	6½	151,843	+ 3,936
Glasgow Subway.....	,, 15	928	1,030	+ 102	29	23,170	+ 3,218
Glossop (U. Elec. Supp.)	,, 15	134	135	+ 1	29	3,883	+ 424
Halifax Corporation.....	,, 11	2,203	2,226	+ 23	14½	33,114	— 378
Do. Motor Omnibuses	,, 11	60	67	— 3	14½	589	— 67
Hastings & District.....	,, 14	1,059	1,166	+ 106	28	24,653	+ 528
Huddersfield Corp.	,, 15	2,652	2,892	+ 240	15	44,426	+ 3,605
Hull Corporation	,, 15	3,044	3,279	+ 235	15	47,241	— 68
Ilford U.D.C.	,, 15	670	713	+ 43	15	10,570	+ 501
Ilkeston Corporation ...	,, 19	142	135	— 7	16	2,160	+ 71
Ipswich Corporation	,, 15	625	615	— 10	15	8,272	+ 223
Isle of Thanet	,, 15	498	453	— 45	41	11,758	— 2,147
Kilmarnock Corp.	,, 8	174	175	+ 1	7½	1,308	— 58
Lanarkshire	,, 13	2,012	2,255	+ 243	28	61,967	+ 9,669
Lancashire United	,, 12	1,777	1,844	+ 67	28	48,288	+ 1,492
Leeds City.....	,, 15	9,111	10,005	+ 894	16	148,261	+ 11,777
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	,, 15	881	914	+ 33	8½	7,550	+ 524
Leyton U.D.C.....	,, 13	1,725	1,762	+ 37	15	24,842	+ 54
Liverpool Corporation...	,, 15	14,156	14,690	+ 534	28½	385,822	+ 16,337
Llandudno & Colwyn B.	,, 14	468	492	+ 24	32½	8,804	— 239
London County Council	,, 7	47,297	49,616	+ 2,319	13½	657,523	+ 93,374
London Genl. Omnibus	*	...	...	...	...	...	...
London United.....	*	...	...	...	...	...	...
Lowestoft Corporation...	,, 10	188	132	— 56	35½	4,642	— 1,379
Maidstone Corporation..	,, 13	224	222	— 2	15	3,246	— 101
Manchester Corp.....	,, 15	18,045	19,055	+ 1,010	15	287,851	+ 33,284
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	June 24	177	203	+ 26	12½	2,665	+ 257
N'castle-on-Tyne Corp.	July 4	6,412	6,753	+ 341	13	84,099	+ 2,288
Newport (Mon.) Corp....	,, 15	883	930	+ 47	15	13,873	+ 782
New St. Helens & Dist.	,, 12	1,072	1,083	+ 11	2	1,921	— 69
Northampton Corp.....	,, 14	817	695	— 122	15	10,444	— 1,320
Nottingham Corp.....	,, 13	3,844	3,993	+ 149	15	57,223	— 55
Oldham Corporation ...	,, 16	2,420	2,462	+ 42	16	40,602	+ 2,054
Portsmouth Corp.....	,, 15	2,498	2,886	+ 388	16	41,314	...
Preston Corporation.....	,, 12	967	1,126	+ 159	14½	16,056	+ 1,652
Provincial	,, 15	2,411	2,633	+ 222	41	89,594	+ 4,559
Reading Corporation.....	,, 6	858	847	— 11	13½	11,308	+ 370
Rhondda Tramways.....	,, 6	1,215	1,298	+ 83	27	32,952	+ 1,796
Rochdale Corporation...	,, 15	1,764	1,785	+ 21	15½	27,700	+ 585
Rotherham Corp.....	,, 19	1,165	1,548	+ 383	15½	22,986	+ 5,228
Salford Corporation.....	,, 17	5,429	5,468	+ 39	15½	85,385	+ 3,655
Sheffield Corporation....	,, 16	9,151	10,679	+ 1,528	16½	167,055	+ 27,642
Southampton Corp.....	,, 12	1,566	1,657	+ 90	14½	23,498	+ 1,437
Southend-on-Sea Corp...	,, 12	836	1,010	+ 174	15	12,187	— 15
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.....	,, 15	823	896	+ 73	15½	12,217	+ 206
Sunderland Corp.....	,, 16	1,572	1,708	+ 136	15	24,097	+ 1,005
Sunderland District....	,, 12	565	602	+ 37	37	21,479	+ 1,101
Swindon Corporation	,, 12	206	201	— 5	14½	2,929	— 12
Torquay Tramways.....	,, 6	593	604	+ 11	27	13,445	+ 145
Tyneside Trys. & Tmrds.	,, 5	644	489	— 155	1	449	— 156
Wallasey Corporation ...	,, 15	1,420	1,438	+ 18	15½	20,428	+ 458
Walsall Corporation.....	,, 15	797	824	+ 27	29	22,597	+ 2,519
Walthamstow U.D.C....	,, 15	993	1,129	+ 136	15	16,461	+ 2,050
Warrington Corp.....	,, 6	483	497	+ 14	14	6,713	+ 469
West Ham Corporation ...	,, 13	3,239	3,346	+ 107	14½	48,636	+ 1,891
Wigan Corporation	,, 13	1,567	1,673	+ 106	15	24,828	+ 1,467
Wolverhampton Corp....	,, 13	1,160	1,224	+ 64	16	19,140	+ 1,655
Yorkshire (W. Riding)...	,, 16	1,567	1,710	+ 143	29	49,112	+ 4,321

* Issue of Traffic Returns suspended during the War.

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TRAMWAY TRACK CONSTRUCTION
AND
MAINTENANCE
BY
R. BICKERSTAFFE HOLT,
HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

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Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

URBAN DISTRICT OF BARKING TOWN.

The above Council are prepared to receive tenders for the supply, delivery, and erection at the Council's Electricity Works, East Street, Barking, of the following plant:—

Section 1.—Extra-high-tension cables.
Section 2.—Main switchgear.
Section 3.—Sub-station switchgear.
Section 4.—Transformers.

Successful tenderers will be required to enter into a contract to pay the trade union rates of wages and to recognise the trade union hours of labour.

Specification with form of tender may be obtained from Mr. W. E. Kidner, A.M.I.E.E., Acting Engineer and Manager, Electricity Works, East Street, Barking, upon payment of a deposit of £1 1s., which will be refunded upon receipt of a bona-fide tender.

Sealed tenders, endorsed "Tender for Electricity Plant," may be delivered to the chairman of the Electricity and Tramways Committee, at 7 p.m. on Tuesday, August 15, 1916, or be sent by post, or delivered to the undersigned so as to reach him before the date and time mentioned.

The Council do not bind themselves to accept the lowest or any tender.

By order of the Council,
E. A. PRATT,
Acting Clerk.

Public Offices,
Barking, Essex.
July 22, 1916.

LONDON COUNTY COUNCIL.

The London County Council invites Tenders for the Supply and Delivery of 370,000 Creosoted Deal Paving Blocks for paving the tramway tracks. The form of tender may be obtained from the Chief Officer, London County Council Tramways, 62, Finsbury Pavement, E.C.

No tender received at the County Hall after 1 p.m. on Tuesday, August 15, 1916, will be considered. The Council does not bind itself to accept any tender.

JAMES BIRD,
Clerk of the London County Council.

COUNTY BOROUGH OF HALIFAX.

CLARK BRIDGE REINFORCED CONCRETE.

The Highways Committee of the Halifax Corporation are prepared to accept tenders and designs (in Reinforced Concrete) for the reconstruction and widening of Clark Bridge, Halifax.

Further particulars may be obtained on application to James Lord, M.I.C.E., Borough Engineer, Town Hall, Halifax.

Tenders, endorsed "Clark Bridge," to be sent to the undersigned on or before Saturday, August 5, 1916.

The Corporation do not bind themselves to accept any of the designs or tenders submitted.

By order,
PERCY SAUNDERS,
Town Clerk.

Town Hall, Halifax.
July 8, 1916.

LONDON COUNTY COUNCIL.

The London County Council invites tenders for the supply and delivery of 1,000 forged-steel driving-wheel tires, and 500 forged-steel trailing-wheel tires for electric tramcars.

The form of tender may be obtained from the Chief Officer, London County Council Tramways, 62, Finsbury Pavement, E.C.

No tender received at the County Hall after 1 p.m. on Tuesday, August 22, 1916, will be considered.

The Council does not bind itself to accept any Tender.

JAMES BIRD,
Clerk of the London County Council.

FOR SALE.

COUNTY BOROUGH OF WALSALL.

ELECTRIC SUPPLY DEPARTMENT.

Sale of Second-hand Plant and other material.

Tenders are required for the purchase of the following:—

(*a*) Two Bumstead and Chandler 250 h.p. steam engines, direct coupled to D.C. generators.
(*b*) One Bumstead and Chandler 14 B.H.P. engine, coupled to forced draught fan.
(*c*) A number of assorted glass accumulator cells.
(*d*) Four panels, British Westinghouse mining type switchgear for 3,300 volts, three phase, 50 periods, consisting of:—One feeder panel with ammeter 0-80, voltmeter 0-4, 500, non-automatic oil switch. Three transformer panels, with ammeter 0-40, overload trip on oil switch.

The generating sets will be sold separately or together at the option of the seller.

Full particulars, conditions and terms of sale, together with tender form, may be obtained from the undersigned.

Tenders should be addressed to the Manager, Electric Supply Department, Walsall.

H. A. HOWIE,
Engineer and Manager.

Wolverhampton Street Walsall.
July 18, 1916

POSITIONS VACANT.

AYLESBURY URBAN DISTRICT COUNCIL.

ELECTRICITY DEPARTMENT.

FITTER.

Wanted, Fitter to take charge of repairs and maintenance of two Diesel oil engines and other plant at the above works. Applicants preferred with sound mechanical training, experience of running of high-speed engines, central station experience, and technical knowledge. The person appointed will rank as Chief Assistant, and the wages will be £2 10s. per week. Applications to be sent to the undersigned by Thursday, August 3.

W. A. TURNBULL, A.M.I.C.E.,
Chief Electrical Engineer.

DIESEL ENGINE DRIVER FOR INDIA.

Diesel Engine Driver wanted to supervise the running of three 150-kw. Diesel engine set, and to keep the same in thorough working order. No one need apply who is not prepared to carry out repairs himself. Salary £20 a month, and free second-class passage to India, on three years' agreement.

Apply, stating qualifications and experience, to: J. Ferguson, c/o Messrs. Willans and Robinson, Victoria Works, Rugby, England.

SWITCHBOARD ATTENDANT.

Switchboard Attendant required for combined three-wire Lighting and Traction Supply Station. Experience in 3-phase generation a recommendation, but not essential. Wages 35s. per week, rising yearly 2s. 6d. per week to 40s. Only applications from persons whose present employers are willing to release them will be considered. Write, stating age, experience, and enclose copies of not more than two recent testimonials, to Mr. G. R. Spurr, Electrical and Tramways Engineer, Priory Avenue, Walthamstow.

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equipment up to date had only cost £18,134, leaving a balance of £11,848. This showed that the work had been carried out with the least possible expenditure of capital. At the present time the last length of the installation was well under way towards completion. The whole of the overhead construction was carried out at the contract price of £923 per route mile.

The net revenue account showed a surplus of £51, which had been carried to reserve and renewals fund account. If only the average amount of frosty, hard, cold weather, which it was customary to expect in winter time, had been experienced, the net financial result would have been very much more satisfactory. The total revenue had been £4,973, on a capital expenditure of £18,134. The amount provided and set aside for sinking fund had been £965, making a total of £1,429 in hand for this purpose.

In our issue of December 9 last we published an illustrated and detailed description, written by Mr. Webber, of the railless undertaking, together with a map of the district. The routes were previously operated by motor-omnibuses at a loss. The railless vehicles are of the overrunning trolley type. The overhead equipment was supplied and erected by Messrs. Clough, Smith and Co., Ltd.

APPLICATIONS TO TRIBUNALS.

Paisley District Tramways Company applied to the Renfrew Tribunal for the exemption from military service of twenty-two attested married men. The company's representative stated that before the war they employed 210 men, and there were now 132 men, 72 women, and 26 boys, although an increase in the number of cars run is now necessary in order to carry munition workers. The twenty-two men appealed for were exempted till October 31, and three of the eight men whom the company are releasing were granted final exemption till the end of August.

Exemption until September 10 has been given to seven motormen, an inspector, the chief clerk and stores superintendent, and a turner employed by Maidstone Corporation Tramways. A motorman who had served for many years in the army was granted conditional exemption.

The Imperial Tramways Company have been refused exemption for a coach painter, although the representative of the company informed the Middlesborough Tribunal that he had to attend to the cars in which six thousand munition workers were carried. It was further stated that the military representative had visited the depot for the purpose of eliminating unnecessary men, and that he found none.

Blackpool, St. Annes, and Lytham Tramways Company secured conditional exemption for two motormen and a permanent way foreman. Out of an original staff of 125 men, 110 have joined up.

On the ground of public utility the Luton tribunal have exempted a driver in the employ of the company running the motor omnibuses between Luton, Hitchin, and Barton. Last year over 80,000 passengers were carried. The Barton journeys required a very expert driver. The manager added:—"We want more omnibuses on but we can't get the drivers. The London Omnibus Company have got 150 omnibuses without drivers, and they are offering 10s. a day and can't get one."

ALTERATION OF FARES.

An increase of fares is threatened at Blackburn. Councillor C. Higham, vice-chairman of the Tramways Committee, stated on July 8 that the expenditure had gone up by leaps and bounds, and £1,400 a year was being paid to enlisted employees' dependants. Owing to the unfavourable weather for riding, the receipts had declined, and before very long the committee might have to consider the question of raising fares.

In the discussion at the West Ham Council meeting before the adoption of the Tramways Committee's recommendation, based on the report of Mr. J. S. D. Moffet, the general manager, for the abolition of halfpenny fares, a representative of the Labour party said the scheme was not accepted by his side because they believed in it. It was a regrettable necessity, due to the policy of robbing Peter to pay Paul. References were made to the condition of the track, and Alderman Crow said the money for repairs would have to come out of the rates. The Council had appropriated several sums from the tramway funds for the relief of the rates.

A correspondent of a local journal has recalled that before Leyton Council adopted a halfpenny fare they had the advice of many tramway managers that such a fare would not prove profitable. Since then the working expenses have increased from 6.1*d.* in 1907-8 to 7.01*d.* in 1913-14. Since 1911-12 there has been a deficiency in the tramways account, which has grown year by year until this year it is estimated that the deficit will be £6,665—upwards of a 3*d.* rate, 2¾*d.* of which is included in the rate of 2*s.* 3*d.* in the £ for the current half-year.

Limitation of Petrol Supplies.—Although lacking a definite statement by the Petrol Control Committee, there is no doubt of the correctness of the announcement that commercial vehicles are to have their full supply curtailed by 50 per cent. For some departments of traction the restriction is to be even greater. The Committee threaten to end altogether the system of traders delivering parcels over a thirty-mile radius from London. All the week the offices of the Committee at Berkeley Street, W., have been thronged with commercial users complaining of the allowances. A member of the Committee has stated in an interview that they were not knocking off motor omnibuses for the fun of the thing, but because the needs of the Government compelled them to. During the week the London General Omnibus Company have curtailed five more services. Last week fifteen services were suspended or curtailed.

SOUTHAMPTON CORPORATION TRAMWAYS.

The annual report of Mr. W. T. Robson, general manager, contains much interesting information relating to the working of the tramways, which have been largely affected by the war. A large number of munition workers have been carried, and on March 13 the Ministry of Munitions certified the undertaking under the Munitions of War Amendment Act, 1916, with the result that a much speedier delivery of materials has been obtained.

For a considerable period a special recruiting car was placed at the disposal of the military authorities, the most obvious result being the speedy depletion of the tramways' own staff. The total number of enlistments from the permanent staff to March 31 last was 135, equivalent to thirty-nine per cent. During the year £4,356 was paid in war-service allowances to men with the forces, and, in addition, war bonuses to the amount of £1,276 were paid to employees.

Owing to the scarcity of men, women conductors were first employed in August, 1915, and the department now regularly employs over sixty women. At their own request the hours and conditions of work were made exactly the same as those of the men, and the result is described as exceedingly satisfactory. Suitable premises for the accommodation of women conductors were provided, and systematic training is given before they enter upon their work. In October, 1915, the first woman conductor appointed was promoted to the position of inspector, and has since carried on the training and supervises the work of the women employed as conductors.

A handsome Roll of Honour has been constructed in the tramway works out of oak timbers forming part of H.M.S. *Southampton*, which was built in 1806 and broken up in 1912. This occupies a prominent position in the tramway office, and will form a lasting memorial of the patriotism of the employees in the department. The principle of merit stripes adopted some time ago in the case of conductors has been extended to motormen. These stripes are granted subject to certain conditions being fulfilled: one stripe for each five years' service carrying with it a weekly payment of one shilling. Offences have been very rare in the case of merit-stripe men.

Early this year the permanent way was entirely reconstructed from the Dock Station to Holy Rood, and double track was laid down in the place of single track in Bridge Street, which has improved the time of the cars. The total cost was £4,207, this being at the rate of about £12,000 per mile of double track, an exceedingly satisfactory figure, as the manager observes, for war time renewal. Two new methods of joint repairs have been introduced during the year; one, the application of Thermit welding, has only been tried for this purpose on one system previously. The other method consists of packing all springing joints by driving in a species of resilent material and applying a waterproof cement to ensure that no deterioration can take place. The total number of joints Thermit welded during the year was 272.

The toast-rack type of car for summer time traffic has been much appreciated, and Mr. Robson recommends that trailers of this type should be provided.

MISCELLANEOUS NEWS AND NOTES.

Increased Cost of Energy.—Colchester Corporation have increased the price charged to the tramways for energy by 1·8*d.* per unit, making the present price 1·625*d.* per unit.

Insurance Against Air Raids. Glasgow Corporation Tramways Department expended during the year ended May 30 the sum of £3,467 on insurance against damage by aircraft.

Railway Workshops Electrification.—In the report of H.M. Trade Commissioner to New Zealand for the year 1915 it is stated that the Government Railways during that period entered upon the work of electrification of the workshops.

London-Southend Railway Electrification.—Application has been made to the Board of Trade by the Midland Railway Company for an extension until 1917 of the powers for working by electric traction their railway from Fenchurch Street to Southend.

Enemy Interest in Filament Lamp Companies.—The President of the Board of Trade announces in the Parliamentary papers of July 25, that steps are being taken with a view to the elimination of the German interest in the principal British registered companies which manufacture filament lamps.

London Car Overturned.—A County Council top-covered car got beyond control while descending Basildon Road hill between Woolwich and Abbey Wood, on July 24. On reaching a curve it left the line, and overturned on striking the kerb. Fifteen passengers sustained cuts and shock.

Conductors' Seat Experiment.—Two cars have been fitted with seats for women conductors on the Darlington tramways. If the result proves satisfactory all the car platforms are to be so furnished.

Special Constables' Travelling Facilities.—By a large majority the London County Council have decided that the special facilities for travelling on the Council's tramcars afforded to the special constabulary are to be withdrawn in October. The total value of the concession is approximately £3,000 per annum.

Danger Signal at the Rear.—In order to warn passengers passing behind a car to beware of vehicles coming from the opposite direction, a Sheffield inventor has devised a removable and folding arm. This is attached above the fender or in any other suitable position at the rear. It bears the inscription "Danger," and at night it can be illuminated.

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Scottish Omnibus Service and a Road Charge.—The Scottish General Transport Company having asked for sanction to the provision of omnibus services between Stirling, Dollar, Loncroft, and Alloa, the Stirlingshire Central District Committee have decided to approve of the application if the company will pay "a charge of ½*d.* per ton mile for twelve months, at the end of which time the matter will be reconsidered."

Fined for Starting a Car.—There is no truth in a widely published report that nine Liverpool passengers have been fined for ringing the bell to stop cars while the women conductors have been on the top deck. The fines were inflicted for ringing the bell to re-start cars. It was because accidents had occurred from the practice that the prosecutions were instituted. Steps are also to be taken to prevent men riding on the platforms in order to talk to women conductors.

Expenditure of Bristol Tramways Committee.—The Tramways Option Committee, who were appointed in February, 1913, to consider the question of the Corporation exercising their option of purchasing the Tramways Company's undertaking, have reported that their expenses have amounted to £2,946, while the expenses incurred by the Council were £5,121. The Committee's expenditure included £1,180 for counsel fees, £1,020 for Parliamentary agents' charges, and £1,164 for experts' reports and services as witnesses before the Parliamentary Committee.

Report on Edinburgh Cable Cars.—A report presented to the Tramways Committee by the expert who has examined the 228 cable cars operated by the Tramways Company, states that their condition indicates that upkeep has not had adequate attention. The under framing of the bodies appears to be sound enough, though the steel and iron parts are much corroded. There is no evidence to show that the under parts have been repainted since the cars were built. The amount of the wear in the brake work is very much worse than the expert has seen on any other tramway system.

Through Ticket on Car and Omnibus.—In their report on the working of the London County Council Tramways for the year ended March 31, the Highways Committee set forth the through services with the Metropolitan Electric Tramways Company, and state that on the through routes to North Finchley and High Barnet there are also through bookings with the London Electric and Central London Railways. The latter through tickets are available for travelling north of Highgate Station either by tramcar or by omnibus between the Archway Tavern and Fortis Green Road. The proportion of the through fares allocated to the Council is the ordinary tramway fare for the distance travelled by tramcar.

Accident Payments by London County Council.—Within the three months ended June 30, London County Council Tramways Department settled 1,333 claims in respect of accidents arising in connection with the tramways, the total sum paid being £10,438. In twenty-nine other cases actions were brought against the Council. In thirteen of these a verdict against the Council was given, and sums amounting to £1,921 and costs had to be paid. Claims made in respect of damage done to tramways property were settled for £807. A knock-for-knock agreement with a firm of brewers in regard to claims not exceeding £5 has been terminated, and in future no claim will be made by either party if the extent of the damage to property does not exceed £5.

Rolling Stock at West Ham.—During the past year twenty-one single truck cars have been equipped with new motors of the G.E.200 ventilated type, which has now been adopted as the standard for the West Ham ordinary four-wheel single-truck type of car. In all thirty-one cars have now been fitted with T.2.G. controllers. This work has been done by the tramways department, in addition to the ordinary up-keep of the rolling stock. In his report the general manager, Mr. J. S. D. Moffet, says that plans have now been completed for putting in hand the work of reinforcing and where necessary reconstructing the car bodies as speedily as the circumstances will allow, but the lack of a sufficient renewals fund and shed accommodation retards the progress of the work.

The Demand for Steel.—The New York correspondent of the "Yorkshire Post" reports a heavy demand for Bessemer iron for export. Many mills are refusing the business because they cannot promise delivery in time. Such is the stringency of labour that common labour in munition plants is paid 10*s.* to 12*s.* a day, and semi-skilled workmen receive 24*s.* to 32*s.* Russia, Sweden, Italy, Portugal, Australia, Cuba, and Japan are in the market for cars, rails, and plates. Russia's chief order for 20,000 cars has been divided between three companies. Two United States railroads are taking 17,500 tons of bridge steel, and the United States Government are asking bids for about 15,000 tons of ship plates. Pittsburg mills have booked 20,000 tons of steel pipe for oil and gas companies.

Fare Stages Shortened at Croydon.—The special report of Croydon Tramways Committee upon the recent strike, which they claimed had involved no loss upon the working, again came before Croydon Council on July 24. The Committee recommended increased wages and improved conditions, and that this cost should be met by a shortening of the fare stages. On the penny fares the proposals represented an increase of 30 per cent. A sharp discussion was closured, and the report was adopted in entirety by 36 votes to 15. The omnibus companies, it was said, were ready to fall into line with the new fares. At the same meeting it was decided to revise the existing fares for through running with the S.M.T. Penge and Upper Norwood system.

Leaving by the Front Door to Manipulate Points.—At Bow County Court, on July 13, West Ham Corporation agreed to pay £8 damages and costs to a passenger who had had the forefinger of her right hand caught in the front door of a car. Evidence was heard to decide whether there had been negligence. Plaintiff stated that while the car was slowing up the conductor, in order to alight to shift the points, opened the front door and slammed it behind him. As he did so the car was pulled up suddenly. The jolt caused her to stretch out a hand to save herself, the forefinger being caught by the closing door. The conductor gave evidence that plaintiff stated neither he nor the driver was to blame, and that there was no jolt. Judge Graham directed the jury that the conductor should have looked before closing the door; and they found that defendants had been negligent.

New Omnibus Routes.—In connection with the Local Government (Emergency Provisions) Act, 1916, which makes it unlawful for any omnibus to ply for hire on any route that has not been regularly used by omnibuses plying for hire within two years prior to March 1, 1916, except with the consent of the highway authority, the Highways Committee of the London County Council have been entrusted with the consideration of matters arising under the Act so far as they affect the position of the Council as highway authority.

Cardiff and Wallasey Settlements.—Representatives of the Cardiff Corporation Tramway employees on July 24 were accorded an interview by Mr. A. Ellis, the general manager, respecting the matters in dispute between the Union and the Tramways Committee. It is understood that the employees have decided to accept the offer made by the Committee, including a farthing an hour increase in wages to motormen and conductors over twenty-one years of age.—It is understood that the Wallasey tramway employees are satisfied with the recommendations that have now been made by the Wages Board of the Corporation for the improvement of their conditions of pay. The proposed new scale is as follows: Drivers, 6½*d.* per hour for the first year, 6¾*d.* second year, 6¾*d.* after three years, 7*d.* after five years, 7½*d.* after seven years, and 7½*d.* after nine years; conductors, 6*d.* first year, 6½*d.* second and after three years, 6½*d.* after five and seven years, and 6¾*d.* after nine years. The wages of inspectors and timekeepers, it is proposed, shall be increased 2*s.* per week. Both drivers and conductors receive an annual holiday bonus after the following rate—First year, 9*d.*; second year, 1*s.*; after three years' service, 2*s.*; after six years, 2*s.* 6*d.*; and after nine years, 3*s.* per week.

L.C.C. Tramway Matters.—The London Council have appointed their vice-chairman and deputy-chairman to represent them at the annual meeting of the Municipal Tramways Association. Tenders are to be invited for the supply of steam and exhaust piping to be provided in connection with the installation of the third additional turbo-generator at Greenwich generating station, and the chairman and vice-chairman of the Highways Committee are authorised during the summer recess to open any tenders which may be received for this work. The Highways Committee reported that they had purchased 43,835 tons of coal for use at Greenwich generating station, at a cost of about £70,000, during the quarter ended June 30, 1916. The Highways Committee have sanctioned the purchase of tramway material and the execution of small works and repairs, at a cost of about £25,959. They have also accepted tenders for the purchase of fifty-seven lots of old tramway plant and materials, the total amount realised being £10,931.

Committee on Production and Manchester Tramways.—The following finding is in respect of an application made to the Tramways Committee of the Corporation of Manchester by the Amalgamated Association of Tramway and Vehicle Workers for the payment of a war bonus of 5*s.* per week to drivers, conductors, timekeepers, ticket and motor inspectors, depot clerks, shedmen, drivers of freight vans, overhead and motor wagon drivers, and parcel despatchers. The application formed the subject of negotiations between the parties, but no settlement was arrived at and the difference was referred to the Committee on Production for decision. Representatives of the parties were accordingly heard on June 26. In accordance with a finding of this Committee, dated July 26, 1915, the workpeople concerned are at present in receipt of a war bonus of 1*s.* per week to employees between eighteen years of age and twenty-one years, and 2*s.* per week to employees aged twenty-one years and upwards in receipt of 38*s.* per week or less; employees receiving over 38*s.* per week and under 40*s.* are paid a bonus sufficient to raise the normal weekly wage to 40*s.* In their award, issued this week, the Committee state that they have given careful consideration to the statements and arguments submitted to them in connection with the present application, and their finding is that as from the beginning of the first full pay in July, 1916, the scale of bonus to male employees shall be increased to 2*s.* per week in the case of the employees between eighteen years of age and twenty-one years, and to 4*s.* per week in the case of employees aged twenty-one years and upwards in receipt of 38*s.* per week or less; employees receiving over 38*s.* per week and under 42*s.* are to be paid a bonus sufficient to raise the normal weekly wage to 42*s.* The Committee award no addition to the bonus now being paid to female employees. The Corporation's case was presented by Mr. J. M. McElroy, general manager, and the case for the men by Mr. G. T. Jackson, general secretary.

PERSONAL.

Mr. T. Britten, manager of the Chelmsford works of Crompton and Co., Ltd., has been elected a director of the company.

Captain G. C. Whitaker, Leeds "Pals" Battalion, who has been killed in action, was shortly to have married Miss Mary Hamilton, daughter of Mr. J. B. Hamilton.

Lieutenant R. E. Bullough, South Midland T.F. unit of the Royal Engineers, who has been wounded in France, is the son of Mr. R. C. Bullough, general manager of Colchester Corporation Tramways.

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Mr. A. E. Wray's work as general manager of the Luton Corporation tramways during the difficulties of the past two years or so was alluded to by members of the Tramways Committee at a recent meeting. He was complimented by the Committee on the general improvement of the undertaking. The Tramway is worked for the Council by Messrs. Balfour, Beatty & Co.

Private F. Rockett, of the electrical engineer's department of Hull Tramways, and Sergt. F. Robson, a reservist of the 2nd Coldstream Guards, formerly a Hull conductor, have been awarded medals for gallantry. The first named received the D.C.M., while the sergeant, who was slightly wounded at Mons, has the Military Medal.

2nd Lieut. Broster, 6th Liverpool Rifles, who enlisted in 1914, was a clerk in the offices of Liverpool Corporation Tramways. Early in the war he was promoted to sergeant and awarded the D.C.M. For a more recent act of gallantry he was granted a commission and another decoration. Six other clerks from the office have also been granted commissions, out of thirty-five clerks who enlisted at an early stage of the conflict. Three others have been killed. The total number of employees serving with the colours is 1,400.

Mr. J. S. D. Moffet, general manager of West Ham Corporation Tramways, was this week appointed to a similar position at Belfast, at a special meeting of Belfast Corporation. Mr. Moffet was one of four candidates whose names were submitted to the Council by a deputation of the Tramways Committee, who had visited various towns and interviewed selected candidates. The three other gentlemen left for the final choice were Messrs. W. J. McCombe (Hull), R. S. Pilcher (Aberdeen), and R. H. Wilkinson (Huddersfield). The salary attached to the post is £800 per annum, rising to £1,000. Mr. Moffet succeeded Mr. H. E. Blain at West Ham in August, 1913, and of all the Metropolitan managers he has perhaps had the most trying time. Besides having to contend with omnibus competition, Mr. Moffet worked earnestly and successfully to place the West Ham undertaking on a sound basis in the matter of fares. It was only a few weeks ago that the Council adopted his scheme for the abolition of the halfpenny fare and the institution of the universal penny fare. He has also secured a trained permanent way engineering staff for the tramways. For nine years Mr. Moffet was general manager of the Rochdale Corporation Tramways, and between 1899 and 1904 he was chief engineering and tramways assistant to the borough engineer of Rochdale. Prior to that he was trained as a civil engineer by the Sunderland borough engineer, following an apprenticeship in a local engineering establishment, preceded by studentship at the Heriot Watt Engineering College, Edinburgh, and the College of Science at Durham University. Mr. Moffet will take up his duties in September, when Mr. Nance retires and becomes consulting engineer to the tramways department.

Motorman W. R. Martin, Bristol Tramways Company, has been killed in France while working a machine gun of a local battalion. His officers have written of his "willing and daring service, unselfishness, and cheery helpfulness."

The Late Professor Thompson.—Mr. John E. Raworth, president of Finsbury Technical College Old Students' Association, writes that the Association are engaged on the formulation of a scheme to enable all those interested to perpetuate the memory of the late Professor Silvanus Thompson.

CONTRACTS AND ORDERS.

I. Firth and Sons' tender has been accepted for masons' work in an extension of Halifax tramways depot.

Chloride Electrical Storage Company, Manchester, have a contract to supply a storage battery to London County Council in connection with the lighting of Woolwich tunnel.

Messrs. John Cantor and Company of Old Nichol Street, Shoreditch, London, E., supplied the new uniforms for the Portsmouth Corporation Tramways to which reference was made in our issue of July 15.

Leeds Forge Company have received an order for underframes and bogies for motor coaches and bogies for trailer coaches now being constructed in England for the Buenos Ayres Western Railway. The value of the order is placed at about £70,000, and the work is in connection with the electrification of a section of the railway.

FINANCIAL REPORTS AND MEETINGS.

Hadfields Ltd. have declared a dividend of 1s. per share on the ordinary shares, free of tax.

Dundee Tramway Finances.—Councillor G. A. Johnston, chairman of the Tramways Committee, has stated that the department is in a strong position. In ten years the revenue had increased from £50,154 to £71,940, and in that time £103,042 had been contributed to the sinking fund, while to the accident, renewals, and depreciation funds there had been paid £97,804.

Belfast Corporation Tramways. The Tramways Committee have received the city's accountant's report on the audit of the tramway undertaking for the year ended March 31 last. After allowing for all fixed charges and for the annual payment of £17,000 for depreciation, there remained to the credit of the appropriation account a balance of £7,801, which was transferable to the general purposes fund. The transfer was ordered to be made.

Edmundson's Electricity Corporation.—Mr. P. D. Tuckett, presiding at the annual meeting on July 20, said the war had affected almost all of their undertakings. As to the Scarborough Tramway undertaking, the bombardment, followed by the air raids, had not only reduced the resident population but was estimated to have deprived it of nearly 500,000 visitors. The tramway revenue had shrunk by 58 per cent. compared with 1914, and the undertaking presented a very difficult problem, as it was obvious it could not be run indefinitely at a loss. The Lancashire Power Company had increased its profits, though the stage at which they could be divided prudently had not been reached.

DIVIDENDS.

London General Omnibus.—Interim dividend of five per cent., free of tax, on the ordinary shares for the half-year ended June 30, against six per cent. a year ago.

London Electric Railway.—Interim dividend for the first half of 1916 on the ordinary shares at the rate of one and one half per cent. per annum.

Metropolitan District Railway.—Interim dividends for the first half of 1916 on the second preference stock at the rate of 3 per cent. per annum, the same as a year ago.

Underground Electric Railway.—Interest on the six per cent. cumulative debenture stock will be paid on September 1 next, less tax, at the rate of six per cent. per annum and coupon No. 17 off six per cent. income bonds will be paid, free of tax, at the rate of six per cent. per annum, on the same date.

Central London Railway.—Interim dividends for the first half of the present year on the undivided ordinary stock at the rate of three and one half per cent. per annum, and on the preferred ordinary stock at the rate of 4 per cent. per annum. A year ago the dividend on the undivided ordinary stock was at the rate of three per cent.

City and South London Railway.—Interim dividend for the first half of the year 1916 on the ordinary stock at the rate of one and one half per cent. per annum. Last year no dividend was paid on the ordinary stock, the last distribution being one eighth per cent. in 1913.

BUSINESS NOTES.

Thermit, Limited, inform us that the Public Trustee has entered into an agreement to sell the whole of the enemy shareholding in that company to the Birmingham Metal and Munitions Company, Ltd., of Birmingham. Thermit, Limited will continue to trade in exactly the same way as hitherto.

"Modern Electrical Plant."—That well-known firm, the Electric Construction Company, Ltd., of Wolverhampton, and 9, New Broad Street, London, E.C., have lost no time in seeing that before the close of the war their products are made widely known. They have issued a forty-eight-page publication bearing the above title.

Glovers' Calendar.—Glovers and Company, Ltd., the cable manufacturers, have sent to us a copy of the latest edition of their calendar, dating from July, 1916 to June, 1917. There is as usual a leaf to each day, and the whole of them are hung upon two hooks, from which they are easily removable. Each leaf contains either a photograph of some work that the company have carried out, or a topical extract from papers read at the Institution of Electrical Engineers, and from comments made in the technical journals. Thus many valuable thoughts are brought afresh to the recollection of engineers and managers. The following observation by Mr. Charles P. Sparks on the question of the lowest tender we should like to see printed in larger type and hung in the office of every purchaser, and especially in the committee rooms of municipal authorities: "The onus of development and the successful carrying out of a contract are borne by the contractor, and if a reasonable margin of profit is not secured, the contractor cannot, in the long run, do his duty by the purchasers. First, the contractor is crippled, being unable to make provision for development, since without profit new capital cannot be attracted; but what is more serious provision cannot be made for improvements, without which we cannot keep pace with our world competitors."

WEEKLY TRAMWAY TRAFFIC SUMMARY.

TRAMWAYS AS A WHOLE.

The official traffic returns of forty-five of the principal tramway undertakings in the United Kingdom for the week ended July 15, give total receipts of £189,004, or £12,331 more than in the corresponding week of last year. The total length of track included in the returns was 2,252 miles, or seventy more than for the corresponding week. The receipts this year were at the rate of £83 18s. 0d. per mile of single track, and last year at the rate of £80 19s. 4d., thus showing an increase for the week of £2 10s. 2d. per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

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at home and abroad.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

DIVIDENDS. PREV.	DIVIDENDS. LAST.	NAME.	PAID.	PRICE, JULY 27, 1914	CASH. July 27.	A WEEK AGO.
5%	5%	Alabama Traction, 5% 1st. Mt.	—	67	69½	69½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	76/3	76/3
4%	4%	Do. 4% Deb. ...	100	91	74⅜	74
4½%	4½%	Do. 4½% Deb. ...	100	98½	76	75
5%	5%	Do. 5% Deb. ...	100	96	77	77⅜
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1⅝	19/9	19/9
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	96	96
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅜	10½	10½
4½%	4½%	Do. 4½% Deb....	100	96	83½	83½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	92	92
$1	$1	Brazilian Trac. & Power Ord....	$100	66	63½xd	62½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	94½	94
4/-	4/-	Brisbane Elec. Trams. Otd. ...	5	7½	6⅛	6⅛
2/6	2/6	Do. 5% Cum. Pref.	5	5	8⅞	85/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92½	92½
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	40⅛	41
5%	5%	Do. Pref. Ord....	100	106	41	41
5%	5%	Do. 5% Cum. Pref.	100	103	62xd	62xd
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	80½	80½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	64⅝	65½
—	—	Brit. Elec. Trac. Ord.	100	—	35	35
—	—	Do. 6% Cum. Part Pref. ...	100	—	80½	80½
5%	5%	Do. 5% Deb.	100	92	83½	83½
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	70	70
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	92½	92½
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	6⅞	6⅞
1/3	1/3	City of B.A. Trams.	5	5⅜	93/1½	93/1½
5/-	4/-	Dublin United Trys 6% Pref. ...	10	12	10½xd	11xd
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅜	2/1½	2/1½
5/6	6/-	Lanarkshire Trys. Co.	10	10½	9⅜	9⅜
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9¾d.	9¾d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	1⅜	2/3	2/3
6d.	6d.	Do. 5% Pref.	1	⅛	8/10½	9/1½
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	60	55½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88½	88½
5%	5%	Do. 5% Inc. Deb.	100	88½	81	81
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	46½	50
3/-	3/-	Madras Elec. 6% Pref. ...	5	5⅛	96/3	96/3
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67½	67½
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	70	70
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	79½	79½
$1½	$1½	Mexico Trams. Common ...	$100	70	27½	27½
5%	5%	Do. 1 Mt. 5% G.B.	—	8¼	40½	40½
6%	6%	Do. 6% Mt. Bds.	100	76	34½	34½
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	96½	96½
4½%	4½%	Do. 4½% Stg. Debs.	100	99	94	94¼
1/2*	1/2½*	National Steam Car	1	½	19/10½	18/9
9¾d.*	9¾d.*	New General Traction	1	⅛	7/9	7/9
6d.	8½d.	Northern Gen. Trans. Ord. ...	1	⅛	16/-	15/-
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	66/-	66/-
5%	5%	Do. 5% 1st Deb.	100	89½	73½	73½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80½	80½
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	⅛	11/3	10/10½
8d.	10d.	Provincial Trams. Ord.	1	¼	16/6	16/6
5%	5%	Rhondda Trams. 5% M.D. ...	100	88	84½	84
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	91½	91½
5%	5%	1st. Mt. 5% 50 yr.	100	89½	82	82
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	90½	90½
5%	5%	Do. 5% Perp. Deb.	100	99½	82	82
—	—	Singapore Elec. Trams	5/-	¼	5/-	3/7½
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	94½	94½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	85	85
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	92½	92½
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	79½	78½
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	¾	9/3	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	90/-	90/-
		Metropolitan Dist. Ord. ...	100	21⅜	19/-	19½
		Undgd. Elec. Rys. of London ...	10	2½	39/-	39/0½
		Do. "A"	1/-	⅜	6/1½	6/6
		Do. 4½% Bds of 1933 Rd.	—	99	101½	102½
		Do. 6% 1st Cum. In. Db.	100	114	106½	106⅝
		Do. 6% In. Bonds Rd. ...	—	88	91	88½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1915	1916	Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	July 22	£49,235	£49,729	30	£1,482,045 —	£2,433
Auckland.....(28 days)	June 30	19,139	21,705	52	274,763 +	7,515
Ballarat and Bendigo ...	May 21	2,855	3,855	8	7,582 +	777
Brazilian Traction Mlrs.	May	6,670 110	7,091,000	22	32,989,000	+1,806,830
Brisbane	Apr.	29,890	32,575	18	129,450 +	12,610
British Columbia.....$	May	512,568	542,353	47	6,073,546 —	734,924
Buenos Aires Lacroze ...	June 12	40,421	36,213	52	490,818 —	15,324
Burmah Tramway ... Rs.	July 22	4 900	3,037	51	... +	4,209
Calcutta.....Rs.	„ 22	68,754	68,933	30	1,951,933 +	88,221
Cape Town	June	...	12,920	...	...	...
Carthagena & Herrerias..	June	2,059	3,512	26	16,369 +	5,721
Cordoba	May	14,494	14 868	9	28,921 +	818
East India	June	2,194	2,283	48	23,150 +	1,597
Hong Kong .....$	June 17	10,826	16,624	27	327 027 +	73,522
Kalgoorlie	April	2,841	2,553	17	9,516 —	687
La Plata	June	3,875	3,735	26	25,925 +	160
Lima	Apr.	31,633	33,556	18	134,629 +	5,614
Lisbon .....Escu.	June	...	202,451	...	...	...
Madras .....(2 weeks)	July 16	32,086	34,007	28	404,349 +	29,428
Manila .....$	Apr.	117,450	124,350	...	505,381 +	16,765
Manaos .....Rs.	May	...	152,854	...	...	...
Melbourne	Apr.	...	69,542	...	...	...
Montevideo	June	24,266	25,300	34	241,068 +	14,376
Pernambuco	July 23	2,911	2,908	29½	86,101 —	5,512
Peruvian .....$	June	759,374	929,500	52	9,763,497	+1,403,792
Port Elizabeth	June	...	2,809	...	...	...
Rangoon	June	4,997	4,205	26	28,581 —	1,164
Shanghai .....$	June 19	26,314	29,017	...	...	...
Singapore .....$	June 17	11,799	12,927	24	297,253 +	33,924
Toronto.....$	May	795,262	903,924	22	4,450,708 +	428,203
Winnipeg	May	263,302	276,980	22	1,446,788 —	49,919

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	1916	Incr. or Dec.	Wks.	Aggregate. 1916	Incr. or Dec.
Aberdare	July 11	£325	£384	+ 59	14	£5,530	+ £339
Aberdeen Corporation...	„ 19	2,053	1,864	+ 188	7	13,127	— 286
Accrington Corp.	„ 19	537	555	+ 18	16	9,247	+ 285
Ayr Corporation	„ 22	1,051	745	— 306	10	4,356	— 412
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	„ 23	1,438	1,621	+ 183	16½	24,658	+ 1,890
Birmingham Corp.	„ 22	14,143	16,529	+ 2,386	16	264,352	+ 46,456
Do. Motor Omnibuses	„ 22	867	1,049	+ 182	16	15,354	+ 1,613
Blackburn Corp.	„ 19	1,420	1,300	— 120	16½	21,221	— 642
Blackpool & Fleetwood.	„ 22	1,346	1,526	+ 180	29	17,765	+ 1,508
Blackpool Corp.	„ 20	2,064	2,924	+ 860	16	27,362	+ 4,707
Bolton Corporation	„ 23	2,901	3,093	+ 192	17	47,438	+ 2,545
Bournemouth Corp.	„ 26	2,178	2,515	+ 337	17	37,689	+ 1,681
Bradford Corporation	„ 22	6,642	7,060	+ 418	16	109,977	+ 399
Brighton Corporation	„ 23	1,250	1,451	+ 201	16½	19,343	+ 1,292
Bristol	„ 21	9,823	10,591	+ 768	29	281.171	+ 10,458
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation	„ 22	1,610	1,685	+ 75	17	28,962	+ 1,006
Burton-on-Trent Corp...	„ 23	301	286	— 15	16	4,287	— 512
Bury Corporation	„ 23	1,440	1,581	+ 141	17½	23,971	+ 754
Cardiff Corporation	„ 22	2,828	3,139	+ 311	16	47.494	+ 2,745
Chatham & District	„ 20	1,303	1,336	+ 33	29	33,550	+ 1,200
Chesterfield Corp.	„ 13	272	279	+ 7	15	4,166	+ 144
Colne Corporation	„ 24	234	264	+ 30	...	...	...
Cork Electric	„ 20	514	589	+ 75	29	14,128	— 150
Croydon Corporation ...	Apr. 28	1,726	1,403	— 323	4	5,417	— 666
Derby Corporation	July 22	1,087	1,162	+ 75	16½	18,232	+ 801
Dover Corporation	„ 15	343	338	— 5	15	4,747	— 20
Dublin & Lucan	„ 21	165	195	+ 30	3	548	+ 28
Dublin United	„ 21	6,530	7,034	+ 504	29	165,798	— 8,451
Dundee City	„ 19	1,425	1,408	— 17	9½	12,847	+ 123
East Ham Corporation	„ 22	1,351	1,347	— 4	16½	21,455	— 117
Exeter Corporation	„ 21	414	438	+ 24	16	6,169	— 124
Glasgow Corporation	„ 22	17,842	22,251	+ 4,409	7½	174,095	+ 11,508
Glasgow Subway	„ 22	642	955	+ 313	29	34,125	+ 3,631
Glossop (U. Elec. Supp.)	„ 22	139	144	+ 5	30	4,027	+ 429
Halifax Corporation	„ 18	2,240	2,180	— 60	15½	35,294	— 439
Do. Motor Omnibuses	„ 18	53	47	— 6	15½	736	— 73
Hastings & District	„ 21	1,063	1,266	+ 203	29	25,716	+ 731
Huddersfield Corp.	„ 22	2,849	2,962	+ 113	16	47,389	+ 3,718
Hull Corporation	„ 22	3,115	3,288	+ 173	16	50,530	+ 104
Ilford U.D.C.	„ 16	684	723	+ 39	16	11,293	+ 539
Ilkeston Corporation ...	„ 26	140	155	+ 15	17	2,310	+ 87
Ipswich Corporation	„ 22	649	550	— 99	16	8,822	+ 114
Isle of Thanet	„ 22	576	525	— 51	42	12,279	— 2,198
Kilmarnock Corp.	„ 22	204	187	— 17	9½	1,663	— 86
Lanarkshire	„ 20	2,627	2,478	— 149	29	64,444	+ 9,539
Lancashire United	„ 19	1,849	1,810	— 39	29	50.105	+ 1,450
Leeds City	„ 22	9,286	10,110	+ 824	17	158,372	+ 12,633
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	„ 22	858	951	+ 93	9½	8,501	+ 617
Leyton U.D.C.	„ 20	1,716	1,706	— 10	16	26,548	+ 44
Liverpool Corporation...	„ 15	14,156	14,690	+ 534	28½	385,822	+ 16,337
Llandudno & Colwyn B.	„ 14	468	492	+ 24	32½	8,804	— 239
London County Council	„ 7	47,297	49,616	+ 2,319	13½	657,523	+ 93,374
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation...	„ 10	188	132	— 56	35½	4,642	— 1,379
Maidstone Corporation..	„ 20	223	214	— 9	16	3,460	— 110
Manchester Corp.	„ 22	18,218	19,429	+ 1,211	16	307,463	+ 34,676
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	„ 22	217	230	+ 13	16½	3,486	+ 252
N'castle-on-Tyne Corp.	„ 15	6,546	7,129	+ 583	15	98,221	+ 3,399
Newport (Mon.) Corp....	„ 22	857	1,001	+ 144	16	14,874	+ 925
New St. Helens & Dist.	„ 19	1,074	1,030	— 44	3	2,951	— 115
Northampton Corp.	„ 21	804	691	— 113	16	11,135	— 1,433
Nottingham Corp.	„ 20	3,839	3,888	+ 49	16	61,111	— 7
Oldham Corporation ...	„ 23	2,444	2,806	+ 362	17	43,408	+ 2,416
Portsmouth Corp.	„ 22	2,601	3,019	+ 418	17	44,332	...
Preston Corporation	„ 19	976	1,029	+ 53	15½	17,085	+ 1,705
Provincial	„ 22	2,457	2,698	+ 241	42	92,292	+ 4,812
Reading Corporation	„ 13	823	875	+ 52	14½	12,183	+ 423
Rhondda Tramways	„ 6	1,215	1,298	+ 83	27	32,952	+ 1,796
Rochdale Corporation...	„ 22	1,808	1,914	+ 106	16½	29,615	+ 692
Rotherham Corp.	„ 26	1,187	1,647	+ 460	16½	24,634	+ 5,688
Salford Corporation	„ 24	5,413	6,137	+ 724	16½	91,522	+ 4,376
Sheffield Corporation.	„ 23	9,098	10,990	+ 1,892	17½	178,045	+ 29,522
Southampton Corp.	„ 19	1,554	1,710	+ 156	15½	25,209	+ 1,594
Southend-on-Sea Corp...	„ 19	837	1,019	+ 182	16	13,206	+ 167
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	„ 22	832	904	+ 72	16½	12,854	+ 268
Sunderland Corp.	„ 23	1,597	1,834	+ 237	16	25,931	+ 1,242
Sunderland District...	„ 19	592	647	+ 55	38	22.126	+ 1,157
Swindon Corporation ...	„ 12	206	201	— 5	14½	2,929	— 12
Torquay Tramways	„ 20	559	701	+ 142	29	14,781	+ 372
Tyneside Trys. & Tmrds.	„ 12	650	675	+ 25	2	1,164	— 131
Wallasey Corporation ...	„ 22	1,463	1,539	+ 76	16½	21,967	+ 534
Walsall Corporation	„ 22	807	833	+ 26	30	23,430	+ 2,545
Walthamstow U.D.C.	„ 22	1,011	1,128	+ 117	16	17,589	+ 2,190
Warrington Corp.	„ 20	471	477	+ 6	16	7,685	+ 509
West Ham Corporation	„ 20	3,176	3,259	+ 83	152	51,895	+ 1,974
Wigan Corporation	„ 20	1,637	1,680	+ 43	16	26,513	+ 1,509
Wolverhampton Corp....	*	...	...	...	...	...	...
Yorkshire (W. Riding)...	„ 23	1,635	1,831	+ 196	30	30,943	+ 4,517

* Issue of Traffic Returns suspended during the War.

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TRAMWAY TRACK CONSTRUCTION
AND
MAINTENANCE
BY
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HIGHWAYS AND PERMANENT WAY ENGINEER, CITY OF LEEDS:

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"Tramway Track Construction is in many respects special and peculiar. . . . There is, therefore, ample room and justification for a book which describes methods that have been found satisfactory and gives a reasoned, consecutive account of the work, including the important question of maintenance. . . . The author has recorded the results of his experience with clearness and sincerity and a fullness of reasons for his practice and advice that is somewhat rare in technical books of this kind, and will be found refreshing and convincing, that is, in the sense that the reason behind the views expressed is always in evidence. . . . In conclusion we may say that while this book is a valuable and very fairly complete exposition of tramway track construction in town streets, it does not deal with the important differences that occur in work on country roads, where mixtures of tramway and light railway methods apply. This is no discredit to the author, who has confined himself to the conditions of his own experience."—*The Electrical Review.*

"This book contains a wealth of information concerning construction and maintenance methods employed by English tramway engineers. While English track construction differs materially from American standards from a design standpoint, the care exercised by English tramway engineers during the construction and maintenance periods will be a revelation to American engineers. . . . . In reality this work is a book of instruction on track construction and maintenance, being basicly practical, and doubtless it is the most authoritative contribution on the subject of English tramway tracks that has yet been published. . . . The value of the volume is enhanced by over 150 illustrations carefully selected to illustrate the methods and practices described by the author."—*Electric Railway Journal* (New York).

"This work is sure to become a classic book of reference to all who wish to have a really practical and intelligent knowledge of the subject of which it treats. . . . It has been said that an infinite capacity for taking pains amounts to genius—the author can fairly lay claim to that high position, for it is only by the exercise of such a capacity that he has been able to build up the splendid system of highways and tramways with which Leeds has now been endowed. . . . Unlike many writers of technical books, the author is capable of putting himself in the place of his readers and consequently of so propounding his theses that they can be understanded of all. . . . Our remarks will give some idea, we hope, of the care with which Mr. Holt has collected the materials for his book and the skill with which he has marshalled them."—*Indian and Eastern Engineer* (Calcutta).

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THE

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

MANCHESTER CORPORATION TRAMWAYS.

The Tramways Committee of the Manchester Corporation are prepared to receive tenders for the following, viz.:—
(a) Cloth (serge and pilot).
(b) Making up of uniform clothing.
(c) Uniform caps.

Specification and forms of tender may be obtained on application to Mr. J. M. McElroy, General Manager, Corporation Tramways, 55, Piccadilly, Manchester. Tenders are to be addressed to the Chairman of the Tramways Committee, 55, Piccadilly, Manchester, and must be received not later than 10 a.m. on Tuesday, August 15, 1916.

The Committee do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester.
August 4, 1916.

VICTORIAN STATE RAILWAYS.

The Agent-General for Victoria, Australia, invites tenders for the Supply and Delivery F.O.B. London of:—
Contract No. L8.
144 Copper tubes for steam pressure gauges.
50 Copper tubes for duplex air pressure gauges.

Particulars of requirements may be obsained and samples may be viewed at the offices of the Consulting Engineers—John Coates and Co., Ltd., 115, Victoria Street, London, S.W.

Tenders are to be returned to the Agent-General for Victoria, Melbourne Place, Strand, London, W.C., marked "Tender for Contract L8," not later than 11 a.m. on Wednesday, August 23.

The lowest or any tender not necessarily accepted.

(Signed) PETER MCBRIDE,
Agent-General for Victoria.

CITY OF MANCHESTER.

The Electricity Committee of the Manchester Corporation are prepared to receive tenders for the Supply, Delivery and Erection of One Electrically-driven Circulating Water Booster Pump.

Specification and form of tender may be had on application to Mr. F. E. Hughes, Secretary, Electricity Department, Town Hall, Manchester, on payment of a fee of one guinea, which amount will be refunded on receipt of a bona fide tender.

Further particulars and information can be obtained on application to Mr. S. L. Pearce, chief electrical engineer, Dickinson Street, Manchester.

Tenders, duly endorsed and addressed to the Chairman of the Electricity Committee, must be delivered at the Town Hall, not later than 10 a.m. on Thursday, August 10, 1916.

The firm entrusted with this work will be required to enter into a contract to be prepared by the undersigned.

The Corporation do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester.
July 26, 1916.

URBAN DISTRICT OF BARKING TOWN.

The above Council are prepared to receive tenders for the supply, delivery, and erection at the Council's Electricity Works, East Street, Barking, of the following plant:—
Section 1.—Extra-high-tension cables.
Section 2.—Main switchgear.
Section 3.—Sub-station switchgear.
Section 4.—Transformers.

Successful tenderers will be required to enter into a contract to pay the trade union rates of wages and to recognise the trade union hours of labour.

Specification with form of tender may be obtained from Mr. W. E. Kidner, A.M.I.E.E., Acting Engineer and Manager, Electricity Works, East Street, Barking, upon payment of a deposit of £1 1s., which will be refunded upon receipt of a bona-fide tender.

Sealed tenders, endorsed "Tender for Electricity Plant," may be delivered to the chairman of the Electricity and Tramways Committee, at 7 p.m. on Tuesday, August 15, 1916, or be sent by post, or delivered to the undersigned so as to reach him before the date and time mentioned.

The Council do not bind themselves to accept the lowest or any tender.

By order of the Council,
E. A. PRATT,
Acting Clerk.

Public Offices,
Barking, Essex.
July 22, 1916.

POSITIONS VACANT.

COUNTY BOROUGH OF NEWPORT.

ELECTRICITY DEPARTMENT.

Required urgently, Senior Switchmen and Sub-station Attendants; wages to commence 35s. and 30s. respectively per week of 53½ hours; overtime during the period of the war at single time; the positions will be permanent. Application, in candidates' own handwriting, stating experience and enclosing copies of not more than three references, to be addressed to the undersigned.

A. NICHOLS MOORE,
Borough Electrical and Tramways Engineer.

LLANDILO URBAN DISTRICT COUNCIL.

Charge Engineer Wanted; must have thorough Mechanical and Electrical training and experience, and be ineligible for military service.

Apply for particulars, enclosing stamped addressed envelope.

R. SHIPLEY LEWIS, Clerk,
Llandilo Urban District Council.

Llandilo, August 1, 1916.

BARKING TOWN URBAN DISTRICT COUNCIL.

ELECTRICITY DEPARTMENT.

The above Council is prepared to receive applications for the position of Station Superintendent; previous experience in the up-keep of Turbo Generators, high-speed engines, water-tube boilers essential. A.C and D.C. supply.

Applications in candidates' own handwriting, together with more than three recent testimonials, stating salary required, earliest date duties could be taken up, should be addressed to the CHAIRMAN OF ELECTRICITY AND TRAMWAYS COMMITTEE, Public Offices, Barking, on or before August 15.

E. A. PRATT,
Acting Clerk to the Council.

JUNIOR SHIFT ENGINEER WANTED.

Wanted, Junior Shift Engineer, must have had experience in charge of high tension A.C. Plant; ineligible and have consent of present employers. Commencing salary £2 per week. Apply—

ENGINEER AND MANAGER,
Erith Urban District Council.

SHIFT ENGINEER.

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THE
Tramway and Railway World

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FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, AUGUST 5, 1916.

ENFORCEMENT OF BY-LAWS.

Great as the falling off in serious crime has been during the war, tramway authorities do not seem to have experienced a diminution in the number of people who attempt to evade the payment of the proper fare. Many of them belong to classes who are gainers by war work, and their conduct therefore deserves to be regarded in its most serious light. These offenders are divided into three sections. Perhaps the most serious loss arises from those who ride a greater distance than they are entitled to. Next come those whose ingenuity is devoted to avoiding payment of any fare. In towns where reduced fares are granted to children managers have to deal with the widespread fraud from which railway companies have suffered for generations. We refer to parents endeavouring to pass off children as under the age limit. In one sense this is the most serious of the offences, as it engenders in the minds of the young passengers the impression that there is no harm in conduct in which their mothers indulge. Travelling by car in Glasgow is so cheap that one has almost lost count of the number of stages to be traversed for a halfpenny. Yet a local writer has just been remarking that while the socialistic era of free riding has not yet dawned, many persons do their best to get it unlawfully. He adds that the class causing most annoyance to the conductors, and especially the women conductors, is comprised of passengers, mostly women, who deliberately travel two or even three halfpenny stages when they have purchased only a halfpenny ticket. When challenged they pretend that they were unaware of having exceeded the distance. The writer quaintly observes that such conduct causes the conductors much needless worry to avoid the risk of a reprimand by an inspector. Now there is only one way of dealing with such offenders if by-laws are not to become so much waste paper, and that is to institute proceedings in every case in which the evidence seems likely to secure a conviction. With that end in view conductors should be instructed to obtain the name and address of the passenger, an act that in itself will sometimes lead to the offender at once making a statement that the court will regard as self-incriminating. For that purpose the conductors should receive instructions to record any remark that the person may make. Whenever possible the aid of the police should be invoked to obtain the address, as there is less risk then of a false one being given. Prosecution and the publicity resulting therefrom afford the most effective means of keeping a section of the public in the path of honesty; but it would be a great deterrent to this class of offence if publicity were given in the cars to the by-law that requires a passenger to tender the fare without an application from the conductor. In the Metropolis the ignorance of the public on this point is very marked, and a little expenditure on printer's ink would undoubtedly assist in solving a problem that is alleged to have reached alarming proportions in short distance rush traffic, owing to the inability of the conductors to make the round of the car in time. The loss due to this cause would no doubt be curtailed if means could be devised for enabling conductors to deal out tickets with more speed than is achieved by punching them before a car starts. The need for enforcing tramway by-laws also exists in two other directions, namely, to prevent people pushing on to an already crowded car and boarding a car in motion. Undue laxity in those matters may result in loss of life or physical injury.

EXPEDITING TRAFFIC IN LONDON.

WORK OF THE COUNTY COUNCIL TRAMWAYS DURING THE WAR.

The Highways Committee, at the meeting of the London County Council on Tuesday, presented a report representing some of the services rendered by the tramways in connection with the war. Many changes have been made at short notice in the services, owing to the redistribution of the centres of industry in consequence of the development of munition manufactories. These changes have been of the greatest service to the workers engaged in these industries. More than eleven and a half millions of passengers have been carried weekly, the great majority travelling to and from their work in connection with ordinary industry and commerce, while tens of thousands use the cars to reach the munition works in various districts. Of the various passenger-carrying services the Council's tramways were alone in a position to expand the normal services to an extent sufficient to meet the rapidly growing needs of Woolwich. In July, 1914, just before the outbreak of war, the maximum number of the Council's cars arriving at a certain point during the busiest half-hour was 41; this number has now been increased to 86, an addition of 110 per cent. The number of cars arriving at the same point each day before the war was 975; the number is now 1,595, an increase of over 63 per cent. During the busiest hour to-day accommodation is provided for 13,688 people, compared with 4,094 before the war. Accommodation provided by motor omnibuses in this district, compared with that before the war, shows only a slight increase.

The service between Eltham and Woolwich is still being added to, and further augmentation of the services on the main route through Woolwich from the city termini to Abbey Wood would also be made but for the fact that the section of tramway in one of the main Woolwich thoroughfares, which consists of only a single line with passing places is already worked to its full capacity. The Council has for some time been in communication with Woolwich Council with a view to sections of single line being doubled, and although the borough council has consented to some of the projected doublings, it has declined to agree to doublings to which the greatest importance is attached, except on the conditions, which the Council would not be justified in accepting, that costly street widenings should be undertaken at a proximate date. If the consent of the borough council to these doublings could be secured on the compromise terms that the Highways Committee have submitted to the borough council, it would be possible at an early date to increase appreciably the existing very heavy service on those tramways. To enable the present additional services to be run, the sub-station at Woolwich has had to be enlarged and additional plant installed; new cables between Greenwich generating station and the sub-station and between the sub-station and the tracks have been laid; one section of the track has been doubled, and at three additional points further doublings are in progress. Other parts of London are not being neglected.

Authority has been obtained to carry an excess number of passengers, and this has proved a considerable help in meeting the needs of the arsenal workers. Women have been employed on work formerly done by men, more especially as conductors, the Commissioner of Police having agreed on October 20 to issue conductors' licenses to women. To-day there are 1,072 women conductors. The construction of trailer cars has been expedited as much as possible.

The tramways have been the principal means of meeting the great expansion and redistribution of passenger transit, owing to the

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altered conditions created by the war. The Highways Committee state confidently that no other form of transit could have provided so satisfactorily the increased facilities rendered essential by national requirements. If a comparison be made between tramcars and other forms of passenger conveyance, it will be found, the committee add, that the carrying of a given number of passengers involves the employment of a less number of employees in the case of a tramcar than in that of any other type of road conveyance, thus showing that the fullest possible use of tramway facilities is the most economical as regards labour incidental to passenger services using the roads. Although during the past two years the problem set before the management of meeting the requirements has been a difficult one, the needs of the country have been borne in mind; the services of officers and employees have been lent to the Government for national work; from the beginning of the war men have been encouraged to join the forces of the Crown; substantial allowances have been made to the men enlisting or to their dependants involving a charge on the undertaking of over £168,700, a sum that will be increased to over £200,000 by the end of the current financial year if the war continues until March 31, 1917.

SUPPLIES FOR TRAMWAYS.

The Director of Production, Ministry of Munitions, has sent the following communication to the Tramways and Light Railways Association and the Municipal Tramways Association: -

Certification of Orders for Tramway Material.

"I am directed to write you with reference to the Class B Certificate issued by the West Ham Corporation Tramways in connection with the order placed by them with the British Thomson-Houston Company for 160 35-h.p. tramway motors.

"The general manager of the West Ham Corporation Tramways states that the certificate was given on the basis of a decision by the Ministry that tramways certified under Munitions of War (Amendment) Act, 1916, should issue Class B Certificates for materials on order. Apparently this decision has been communicated to all tramways through yourselves and the Municipal Tramways Association (Incorporated).

"There seems to be some misunderstanding in this matter, as it was not the intention of the Ministry that orders for new motors, new equipment, and similar plant should be certified under Class B. This classification was intended to apply merely to material required for maintenance and repair of rolling stock and permanent way. Under the circumstances I shall be glad if you will take whatever steps may be necessary to correct the wrong impression which has arisen."

The secretary of the Tramways and Light Railways Association has informed the members that the price of steel tires for the quarter to October 1, 1916, will be the same as for the preceding quarter. It is pointed out, however, that the position of hematite iron is at present very difficult, and the manufacturers notify that if the Government should raise the present standard price of hematite pig iron during the quarter the figure now continued for tires may be revised.

PROSPECTIVE RENEWALS AT NEWCASTLE.

In his annual report Mr. W. J. Steele, city engineer of Newcastle-on-Tyne, states that the length of tramway opened for service measured as single track was sixty-six and a half miles. The cost of maintenance of the permanent way was £9,545, equivalent to £143 per mile of single track, or 0.40*d.* per car mile. In addition to ordinary maintenance £1,581 was expended in renewals, equivalent to £24 per mile of single track, or 0.06*d.* per car mile, so that the total cost of the permanent way (exclusive of capital charges) was £11,126, equivalent to £167 6*s.* 1*d.* per mile of single track, or 0.46*d.* per car mile. A considerable length of the permanent way was in urgent need of renewal, but the great difficulty in obtaining a sufficient supply of labour prevented that necessary work being undertaken. The major portion of the track had been in use for nearly fifteen years, consequently, the fact that the present heavy service on a permanent way having many steep gradients was maintained at such a comparatively small cost, was satisfactory, but it was inevitable that the cost would be greatly increased as soon as opportunity would permit of renewals being carried out.

EMPLOYEES' APPLICATIONS.

On the ground that the arrangement ratified by the Committee of Production would be interfered with, Newcastle Tramways Committee on July 27 refused the request of their union employees for an increase of 2*s.* per week. The employees have consequently asked the union to make immediate application to the Committee on Production for an increase of 5*s.* per week for all grades not catered for by skilled workmen's organisations, and that women conductors be placed upon the wages basis as men.

Coventry Tramways Committee have granted an increase of one halfpenny per hour to the car and depot employees, as from July 23, such increase to remain in force until one month after peace is signed, as was provided with respect to the agreement entered into with the men's union for increased rates on April 2, 1915. The skilled employees are to receive increased wages in accordance with the agreement of the Engineering Employers' Association.

While refusing the request of the drivers and conductors of both sexes for a war bonus of 6*s.* per week, Glasgow Tramways Committee have adopted the recommendation of the general manager that the working hours of the traffic staff be increased from fifty-one to fifty-seven hours per week, the employees to be paid overtime at the rate of time and a half for the extra six hours.

L.C.C. TRAMWAY MATTERS.

The London County Council held its last meeting previous to the summer recess on Tuesday. A number of tramway matters were dealt with and an interesting report summarised in another column was presented by the Highways Committee, setting forth the services rendered by the tramways in connection with the war.

SPECIAL COMMITTEE ON ORGANISATION.

The Highways Committee presented a report recalling that on July, 18, in the consideration of the estimates for 1916-17, they reported they were closely investigating the position of the tramways undertaking. They now reported that they had appointed a special sub-committee to inquire into and to report upon the organisation and working of the tramway service. The members of the committee are Messrs. G. M. Gillett, F. C. Harrison, T. F. Hobson, J. Little, and A. H. Scott, together with the *ex-officio* members.

HALFPENNY FARES ON EAST LONDON THROUGH ROUTES.

Letters have been received from Leyton Urban Council and West Ham Corporation Tramways authorities, with whom the Council has through running agreements. Leyton Tramways Committee has passed a resolution declaring that their Council would be favourable to the revision of halfpenny fares and the overlapping stages, or their abolition, if it was found to be advisable and agreeable by the other authorities. In the opinion of that Committee the workmen's fares were too low and required revision. West Ham Corporation Tramways Committee stated that they had agreed that there should be a universal 1*d.* fare for a continuous journey on any one car within the borough; that 1½*d.* workmen's return fares should be adopted in lieu of the penny workmen's return; that return tickets should be issued on all cars scheduled to arrive at a terminus before and up to 8 a.m.; and that existing through fares, where necessary, should be adjusted to comply with the scheme. This decision would have a very important bearing on the through running arrangements, as the value of the portions of the routes in West Ham would be considerably enhanced by the abolition of the ½*d.* fares. West Ham Council would therefore be glad to hear whether the County Council were likely to suspend or withdraw the ½*d.* fares on the portion of the through running routes. The letter added that if the Council were favourable to such an alteration, the opportunity offered itself for arriving at a uniform fare scheme for practically the whole of the tramways operating in the eastern metropolitan area. The Highways Committee stated that correspondence or discussion on the lines indicated in the letters would render necessary a close investigation of the desirableness or otherwise of abolishing or suspending halfpenny fares on the through routes. While it was not in their power to pledge the Council without express instructions to any agreement involving the abolition of halfpenny fares, a strong opinion had been expressed by some of the committee that it was inadvisable to enter upon such discussions without the previous knowledge and consent of the Council. The Committee recommended that they be authorised to enter into negotiation with Leyton Urban Council and West Ham and East Ham Corporations with respect to through running agreements.

Mr. G. M. GILLETT moved as an amendment: "That the Council, whilst prepared to confer with other tramway authorities in connection with through running arrangements, fares and fare stages, is of opinion that no sufficient cause has been shown for depriving the inhabitants of the county of those facilities of cheap transit that are conferred by the existence of halfpenny fares." Several members of the Committee were concerned at the position of the tramways accounts, and suggestions had been thrown out that the time had arrived for a general revision of fares, particularly of the halfpenny fares on account of the difficulty of collection. This, however, was a matter of administration, and the committee appointed to go into the position of the undertaking would be alive to the fact. Some members were concerned at the loss arising through non-collection of fares on crowded cars, but that was a matter of administration and did not supply a reason for the abolition of halfpenny fares. The question would be different if they had no competitors. If they abolished halfpenny fares there was no certainty as to what the policy of the omnibus companies would be. There was no guarantee that if those fares were done away with they would gain a better financial result. The Council had 161 million halfpenny passengers, and they should hesitate before tampering with that custom.

Mr. G. DEW seconded, and urged that it would be a fatal mistake to take the step indicated. Mr. Hume had given an undertaking recently that there was to be no tampering with the fares during the war, and it was for the Council itself to consider the question before going into conference with bodies whose undertakings were differently placed to their own.

Mr. G. H. HUME (chairman of the Committee), said that the undertaking he had given was confined to workmen's fares, and there had never been a suggestion on the Committee that they should be increased. Personally he would hesitate to ask the Council to abolish halfpenny fares, for the proportion of revenue obtained from them was far too great. It would be a bad thing for the tramways if they were going to tell the Highways Committee that they must not make any experiments. All he wanted was to be able to talk over matters with other people, but it was to be understood that no drastic change could be made without the Council's approval. He would be prepared to accept the amendment with some verbal modifications.

Sir J. BENN said that if they were going to confer on a principle which in his opinion lay at the base of the success of the undertaking, let the Council first settle it on their own information. He was going to stand up for halfpenny fares. If halfpenny fares were to be abolished it would have to be made a party issue, for these fares

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were a most useful and necessary instrument for the social assistance and amelioration of London. In support of the view that halfpenny fares were the basis of successful tramway finance, he quoted the figures of Glasgow. London in 1908 carried 81 million halfpenny passengers; to-day they carried 161 millions.

Mr. H. WARD observed that East Enders would rightly complain if halfpenny fares were taken from them and allowed to other parts of London.

After further discussion, Mr. Gillett's amendment was carried by 16 votes to 6.

Mr. J. W. GILBERT then moved the following amendment:—

"That the Council, whilst prepared at all times to confer with other tramway authorities, in connection with through running arrangements on questions of fares and fare stages, is of opinion that no sufficient cause has yet been shown for depriving the inhabitants of the county of those facilities for cheap transit that are conferred by the existence of halfpenny fares, and accordingly instructs the Highways Committee to report, after conference with the Leyton Urban Council, and with West Ham and East Ham Corporations as to the desirableness or otherwise of abolishing or suspending halfpenny or other particular fares or of varying fare stages on the through routes with which those authorities are concerned."

Mr. W. REYNOLDS seconded this motion, which was eventually carried by 52 to 34.

Mr. E. SMITH then moved to omit from the motion the words "halfpenny or other," in order to raise a direct issue. After much debate, this amendment was defeated by 51 votes to 34. After further discussion, Mr. Gilbert's motion was at length carried by 53 to 30.

MUNICIPAL TRAMWAYS ASSOCIATION.

The fifteenth annual conference of the Municipal Tramways Association (Incorporated) will be held, as announced in our issue of July 15, at the Surveyors' Institute, Great George Street, London, S.W., on Thursday and Friday, September 21 and 22. The programme is as follows:—

THURSDAY, SEPTEMBER 21.

10.45 a.m.—Meeting of the Executive Council.
11. 0 a.m.—Presidential address by Mr. P. Fisher, general manager of Dundee Corporation Tramways.
Paper: "Some notes on passenger transportation in large cities," by Mr. J. M. McElroy, general manager, Manchester Corporation Tramways.
1. 0 p.m.—Interval.
2. 0 p.m.—Paper: "Utilisation of tramways for Goods traffic," by Messrs. G. W. Holford, general manager, Salford Corporation Tramways, and W. Clough, general manager, Bury Corporation Tramways.

FRIDAY, SEPTEMBER 22.

10.30 a.m.—Meeting of the Executive Council.
10.45 a.m.—Meeting of Managers' Section.
11. 0 a.m.—Annual General Meeting.

St. Ermin's Hotel, Westminster, S.W., has been selected as the headquarters. It has been decided that no social functions shall take place, and the usual Association dinner will be omitted.

Communications should be addressed to the Hon. Secretary, Municipal Tramways Association, 7, Hall Ings, Bradford (Telegrams: "Tramways, Bradford.").

MISCELLANEOUS NEWS AND NOTES.

Middlesbrough Tramways.—The Corporation have appointed a committee to consider the question of the future of the local tramways of the Imperial Tramways Company when their powers expire in 1918.

Liverpool Employees Refuse Holidays.—At an outing of one of the shifts of the tramway munition workers, male and female, it was decided to forgo all holidays and stand by the Tramways Committee in their endeavours to keep the supply up, and, if possible, to increase it.

Car Overturned at Wigan.—A double-deck car ran off the metals on the incline at the entrance to the loop in Library Street, on the night of July 26, and after running eight yards overturned at right angles to the lines. Seven persons were treated for injuries at the infirmary, where one of them died.

Use of Low-Grade Fuel.—In the annual report of the electrical engineer, Ayr Corporation tramways and electricity undertaking, it is stated that the amount expended on coal showed a decrease of £513, due to the use of low-grade fuel. Its use is rendered possible by the new stoking apparatus installed last year.

Metropolitan Electric Tramways Bill.—This measure, which has received the royal assent, relieves Middlesex County Council from any liability to proceed with the tramway and street widenings authorised by Parliament in 1911. An extension of time is allowed for the erection of railless trolley-car equipment in Wood Green and Tottenham.

London Traffic Inducement.—The presence of the captured submarine minelayer off the Temple pier since July 26 has resulted in a great deal of traffic to the Victoria Embankment by tramcar, omnibus, and underground railway. In seven days 120,000 paid for admission to file past the vessel, the proceeds being given to naval charities. Many more persons were satisfied with a free view from a distance.

Subsidy for an Anglo-Italian Company.—It was stated in the House of Commons, on July 31, that the Government had arranged to give an annual subsidy up to £50,000 for ten years to the newly formed British-Italian Corporation, Ltd. The company's capital of £1,000,000 has been subscribed mainly by the banks, and the objects will be to promote trade and to enable Italy to look to London for financing instead of to Berlin.

York Electric Omnibuses.—Councillor W. H. Sessions, deputy chairman, York Corporation Tramways, stated at the council meeting on July 31 that there was last year a loss of £450 on the electric omnibuses. After five years they would no longer have to pay sinking fund charges and interest in connection with the purchase of the vehicles, and they would then be able to recoup themselves for any present losses.

Edison Tower Wagon at Southampton.—The Edison accumulator tower wagon which was purchased in September, 1915, by Southampton Corporation Tramways Committee at a cost of £715, enabled the department to dispense immediately with two horses. The cost of maintenance, as was anticipated, has so far been negligible, the only expense being the cost of energy. It has been found a great advantage to have the electric light available for night repairs, even though the current be off the trolley wire.

Applications to Tribunals.—Conditional exemption has been granted to an Accrington motorman, who was forty years of age last November. Oldham Corporation Tramways department obtained conditional exemption for a turner, and exemption until November for an apprentice fitter. Six married employees of Carlisle Tramways Company have been granted conditional exemption, the company being so shorthanded that Mr. R. L. McCulloch, the engineer and manager, is obliged to give assistance in driving.

Price of Current at West Ham.—The price charged to the tramways department for energy was revised some time ago by the inclusion of a coal clause, which increased the price per unit from .75*d.* to .84*d.* The new charge came into operation on November 1, 1915, and it resulted in an additional cost up to March 31 last of £738, equivalent to an increase of £2,200 per annum. The consumption during the year was 5,429,098 units for traction, depot, and car repair works, an average of 1.61 units per car mile, as compared with 1.66 units in the previous year, the total cost being £17,703.

Women Conductors and Seats.—Replying to Mr. Gilbert, M.P., the chairman of the Highways Committee of the London County Council stated on August 1 that the matter of seats for the women conductors had been considered, but as no case was made out on behalf of the women no action was taken. He added that there was great difference of opinion in regard to the matter. The general manager of Brighton Corporation Tramways has reported that as the women conductors already sit down for an appreciable part of each journey, further facilities are not needed. He has undertaken, however, to experiment with a view to ascertaining whether it is practicable to provide a seat on the platform.

Important Ticket Decision in Scotland.—In Dumbarton Sheriff Court, on July 28, Mr. K. M'Kenzie, solicitor, objected to the relevancy of a charge made by the Dumbarton Burgh and County Tramways Co., Ltd., against a woman for failing to pay to the conductor the fare for a journey and for leaving the car with the view to avoiding payment. Mr. M'Kenzie contended that before a conviction could be obtained there must be a demand for the fare, and that leaving the car without paying the fare might be an offence, but was not a contravention of the company's by-laws. Mr. W. Ritchie, for the company, submitted that the fact that the accused had left the car without giving an opportunity to demand the fare was a contravention of the regulations. Sheriff Macdiarmid sustained the first objection, and awarded 5*s.* expenses.

Women Conductors.—Wallasey Council, by twenty-seven votes to three, rejected a proposal that the new scale of wages granted to the tramwaymen should apply to the women conductors. It was stated that the latter worked shorter hours, and that the drivers had to attend more to the cars than when there were male conductors. Dundee Tramways Committee have decided not to employ women as conductors as there are plenty of discharged soldiers applying for the work. Complaints having been made regarding parcel boys who had been promoted to the position of conductor, Mr. Peter Fisher, the general manager, informed the Committee that the promotions were made according to a rule in Council in order to prevent the lads' occupation becoming a blind-alley one. Several members of the Committee appealed to the public to show consideration to the boys and wounded soldiers in their new work.

PERSONAL.

Mr. W. Binns, general manager of the Para Electric Lighting and Tramways Company, Ltd., is leaving for England very shortly.

Salaries of Coventry Tramways Staff.—Increases of salary have been granted to all the members of the Corporation tramways staff, the chief officers affected being Mr. H. A. Goodyer, chief clerk and accountant; Mr. E. P. Brown, traffic superintendent; Mr. J. Barry, permanent way foreman; and Mr. A. S. Neason, bookkeeper.

Engineering Standards Committee.—At a special meeting of the Main Committee (Sir John Wolfe Barry, K.C.B., chairman) held on July 27, Mr. Charles le Maistre, A.I.Inst.C.E., M.Inst.E.E., who has been in charge of the work of the electrical section since 1903, was appointed secretary to the Committee in succession to the late Mr. Leslie S. Robertson, who was lost with Lord Kitchener in the disaster to H.M.S. "Hampshire."

Alderman H. W. Littler, who has been a member of the Electric Lighting and Tramways Committee of West Ham since its inception and chairman for seven years in all, owing to his removal into the country resigned his position as chairman on March 21 last. His resignation was accepted with regret, and the Committee expressed appreciation of his valuable services in the following resolution, which has been published in the annual report of the department:

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"Your Committee heard this decision with extreme regret, and in parting with their chairman they place on record their very high appreciation of the excellent services rendered by him both as a member and chairman of the Committee, and of the great interest which he has at all times taken in the efficient development and the successful working of the electricity and tramway undertakings, and they assure him that he retires with their best wishes for the welfare of himself and family, and the hope that the pleasant relationships will continue."

Sergt.-Major J. C. Clay, a Manchester Corporation motorman, has been killed in action. He had served twelve years in the Army, and re-enlisted in November, 1914. He had been recommended for the D.C.M.

Company Sergeant-Major E. C. Laughton, who has fallen in action, was for nine years associated with the lamp and fittings department of Siemens Brothers Dynamo Works, Ltd. He joined the 8th East Surrey Regt. in September, 1914, as a private and went to France early in May of the following year. He was well known to many members of the electrical industry, who will deplore the loss of a valued colleague.

CONTRACTS AND ORDERS.

Hadfields, Limited, have a contract for points and crossings from Bolton Tramways Committee.

Crypto Electrical Company have an order from the Metropolitan Asylums Board for an electric motor for working tire inflators at four ambulance stations.

The Midland Railway Company have again made an arrangement with Shepherd's Parging Block Company, Ltd., of Milkstone, Rochdale, for the supply of their block parging.

Cost of Tickets.—Leeds Corporation Tramways Committee have placed an order for the printing of tickets with a Glasgow firm. Since the war the cost has advanced thirty per cent.

Salford Tramways Committee have allotted a contract to J. Russell and Sons, Wednesbury, for the supply and delivery of forty tramway standards, at £12 17s. 2d. per standard.

Sunderland Tramways Committee have placed the following contracts:—Men's uniforms, H. Lotery, London; men's overcoats, J. Cantor and Company, London; female conductors' uniforms, Bainbridge, Newcastle; female conductors' overcoats, H. Lotery, London.

Shepherd's Parging Block Company, Ltd. have received an order for a large quantity of block parging from the Gloucester Corporation Tramways, and the company's block parging has been specified for two other corporation tramway extensions. The Company ask us to point out that the block parging does not prevent bedding from being squeezed out from under the paving and up into the cavities of the tramway rail, thus letting down the sett. The block parging is just a modern way of filling the space between the base and the head of the rail.

Victorian Railway Commissioners have placed the following contracts:—Cowley's Eureka Ironworks Company, mild-steel masts, bridges and brackets for overhead equipment of Melbourne suburban railways; British Insulated and Helsby Cables, Ltd., three-core cable for Newport workshops, £2,865 11s. per mile; J. Miller, acetylene welding of rail joints, Sandringham-Black Rock railway, £1 13s. per joint; Australian General Electric Company, electrical supplies for point indication during five years, and various equipment for Jolimont car shops and Newport signal shops; Edison and Swan United Electric Light Company, motor generator and switchboard for Jolimont car shops.

FINANCIAL REPORTS AND MEETINGS.

Chatham and District Light Railways Company.—An interim dividend at the rate of three per cent., less tax, on ordinary shares has been declared.

Bristol Tramways and Carriage Company.—The directors announce an interim dividend at the rate of five per cent. per annum for the half-year ended June 30 on the ordinary shares, against four per cent. a year ago.

Blackpool and Fleetwood Tramroad Company.—The board have declared an interim dividend at the rate of four per cent. per annum (4s. per share), free of income tax on the ordinary shares for the half-year.

Edinburgh and District Tramways Company, Limited. The directors intimate that they do not propose to pay any interim dividend on the preferred shares. In the preceding half-year a dividend of 3s. 9d. per share was paid.

L.C.C. Tramway Receipts.—The traffic receipts for the two weeks ended July 19, 1916, were £98,098, an increase of £4,694 as compared with the corresponding period last year. The number of passengers was 23,283,757, an increase of 1,269,841. From April 1 to July 19 (fifteen and a half weeks) the total receipts were £755,621, an increase of £98,068 on the corresponding period of 1915. The route mileage was 141.67.

Croydon Tramways.—The annual report of the general manager, Mr. T. B. Goodyer, for the year ended March 31, has been presented to the Town Council. The total receipts were £94,416. This is an increase of £5,801 over the previous year, in spite of the recent strike. Deducting working expenses, £72,509, war allowances, £4,982, and bank interest and income tax on stock, there remains a gross balance of £18,278. Interest, sinking fund, and income tax reduces this to a net surplus of £844, which has been carried to the renewals fund. In view of the difficulties of the past year and of the strike, which was partially continued for several weeks, the result is an excellent showing.

Wolverhampton Tramways and Chars-a-bancs.—The gross profit on Wolverhampton Corporation tramways undertaking last year amounted to £24,893. On the motor chars-a-bancs a sum of £1,459 was realised. The total gross profit of £26,353 has been disposed of in the following manner:—Interest on capital, £6,666; income tax, £518; repayment of loans, £5,846; renewals account, £5,141; additions and improvements, £1,685; repair work in 1916-17, amount carried forward, £2,477; in aid of borough rate, 1916-17, £4,018. The sum of £56,598 now stands to the credit of the reserve and renewals fund. A considerable amount of maintenance and renewals work was held in abeyanceowing to the depleted labour market and the impossibility of obtaining delivery of certain materials. The mileage run was 1,156,591, against 1,181,309 in 1914-15. The amount of war bonus advanced from £77 to £986. Passenger receipts on the tramways totalled £58,250, an increase of £4,000.

Success of the Penny Universal Fare.—In his report of the working of South Shields Corporation Tramways for the year ended March 31 last, Mr. J. C. Whiteley, the manager, gives the total revenue as £41,827, an increase of £1,081. The total working expenses, including £1,932 paid to dependents of employees who had joined the forces, was £26,317, and after meeting interest and sinking fund charges a net profit remained of £6,504, as compared with £5,594 for the previous year. Of the surplus £2,400 was transferred to the borough fund in aid of the rates, while the balance of £4,104 was placed to the reserve fund, which now totals £33,618. Owing to the shortage of motormen the service had had to be reduced at a time when an increased service was required. The ratio of pay had been increased to nearly all the employees by one halfpenny per hour, and the standard rate was now one of the highest in the country. The penny universal fare was instituted early in 1913-14, on the recommendation of Mr. J. T. Robson, who was then the general manager.

BUSINESS NOTES.

The Zenith Carburetter.—Mr. D. H. Horgan, of Cork, with a Zenith carburetter on his Stellite, has stated that he is getting forty-nine miles to the gallon, while his brother, with the same make of car but another carburetter, only records thirty-two miles to the gallon.

The Skefko Ball Bearing Company, Limited, Luton, sole manufacturers in this country of "Skefko" (S.K.F.) double-row self-aligning ball bearings, have opened a new district office for Scotland at 45, Bothwell Street, Glasgow. The district manager, Mr. J. D. Allan, has been representing the company technically for several years past, and his services and experience are always at the disposal of customers.

Stoneware Electric Utensils.—A new speciality introduced by the Ediswan Company, Ponders End, Middlesex, is the Hosgood stoneware electric utensil of various descriptions. These are illustrated and described in a leaflet, which should be of service to tramway managers in connection with the preparation of food in the employees' mess rooms, particularly in the women's department, both for conductors and cleaners. The prices given are for all standard voltages, but the list for voltage under one hundred will be sent on application.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-four of the principal tramway undertakings in the United Kingdom for the week ended July 22, give total receipts of £102,177, or £17,761 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or 69 more than for the corresponding week. The receipts this year were at the rate of £86 2s. 6d. per mile of single track, and last year at the rate of £80 14s. 2d., thus showing an increase for the week of £5 8s. 4d. per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

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Complete Equipment
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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27, 1914	Cash. Aug. 3.	A Week Ago.
5%	5%	Alabama Traction. 5% 1st. Mt.	—	67	69	69½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4¼	76/3	76/3
4%	4%	Do. 4% Deb. ...	100	91	75	74⅝
4½%	4½%	Do. 4½% Deb. ...	100	98½	75½	76
5%	5%	Do. 5% Deb. ...	100	96	77	77
2d	1/-	Auckland Elec. Trams. Ord. ...	1	1⅜	20/6	19/9
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	94	96
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅛	10½xd	10½
4½%	4½%	Do. 4½% Deb.... ...	100	96	83	83½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	92	92
$¼	$1	Brazilian Trac. & Power Ord. ...	$100	66	62	63½xd
$1½	$1½	Do. 6% Cum. Pref.	$100	97	94¼	94½
4/-	4/-	Brisbane Elec. Trams. Otd. ...	5	7½	6⅛	6⅛
2/6	2/6	Do. 5% Cum. Pref.	5	5	86/10½	87½
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92½	92½
8⅝	8⅝	Brit. Col. Elec. Ry. Def. Ord....	100	107	40⅛	40⅛
6%	5%	Do. Pref. Ord....	100	106	43	41
5%	5%	Do. 5% Cum. Pref.	100	103	62	62xd
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	80½	80½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	64½	64½
—	—	Brit. Elec. Trac. Ord.	100	—	35½	35
—	—	Do. 6% Cum. Part Pref. ...	100	—	80½	80⅜
5%	5%	Do. 5% Deb.	100	92	85	83½
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	70	70
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	92½	92½
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	6½	6⅞
1/3	1/3	City of B.A. Trams.	5	5½	93/9	93/11½
5/-	4/-	Dublin United Trys. 6% Pref.	10	12	10⅞	10½xd
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅛	2/1½	2/1½
5/6	6/-	Lanarkshire Trys. Co.	10	10½	9⅝xd	9⅝
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9½d.	9½d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	⅛	2/3	2/3
6d.	6d.	Do. 5% Pref.	1	1/16	9/10½	8/10½
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	59½	60
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88½	88½
5%	5%	Do. 5% Inc. Deb.	100	88½	81	81
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	46⅜	46⅜
3/-	3/-	Madras Elec. 6% Pref. ...	5	5⅛	96/3	96/3
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67½	67½
$½	$½	Manila Elec. R. R. & Light ...	$100	102	70	70
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	79½	79½
$½	$½	Mexico Trams. Common ...	$100	70	27½	27½
5%	5%	Do. 1 Mt. 5% G.B.	—	8¼	40⅜	40⅜
6%	6%	Do. 6% Mt. Bds.	100	76	34	34½
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	96½	96½
4½%	4½%	Do. 4½% Stg. Debs.	100	99	94	94
1/2*	1/2*	National Steam Car	1	1/16	22/7½	19/10½
9½d.*	9½d.*	New General Traction	1	¼	7/9	7/9
6d.	8½d.	Northern Gen. Trans. Ord. ...	1	⅜	16/-	16/-
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	66/-	66/-
5%	5%	Do. 5% 1st Deb.	100	89½	73½	73½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80⅜xd	80⅜
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	⅜	11/3	11/3
8d.	10d.	Provincial Trams. Ord.	1	½	16/6	16/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84	84½
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	91⅞	91⅞
5%	5%	1st. Mt. 5% 50 yr.	100	89½	82½	82
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	90½	90½
5%	5%	Do. 5% Perp. Deb.	100	99½	82	82
—	—	Singapore Elec. Trams	5/-	¼	4/10½	5/-
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	96½xd	94½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	85	85
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	92½	92½
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	76½	76½
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	9/3	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	90/-	90/-
		Metropolitan Dist. Ord. ...	100	21½	18⅜	19/-
		Undgd. Elec. Rys. of London ...	10	2½	39/-	39/-
		Do. "A"	1/-	⅜	6/4½	6/1½
		Do. 4½% Bds of 1933 Rd.	—	99	101½	101½
		Do. 6% 1st Cum. In. Db.	100	114	106½	106½
		Do. 6% In. Bonds Rd. ...	—	88	91½	91

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1915	Latest Return. 1916	Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	July 29	£47,136	£46,346	31	£1,528,391 —	£3,223
Auckland.....(28 days)	June 30	19,139	21,705	52	274,763 +	7,515
Ballarat and Bendigo ...	May 21	2,885	3,855	8	7,582 +	777
Brazilian Traction Mlrs.	June	6,591,940	6,961,000	26	39,950,000	+2,265,890
Brisbane	Apr.	29,890	32,575	18	129,450 +	12,610
British Columbia.....$	June	498,093	529,078	52	6,602,624 —	703,939
Buenos Aires Lacroze ...	June 12	40,421	36,213	52	490,818 —	15,324
Burmah Tramway ... Rs.	July 29	3,726	3,437	52	... +	3,920
Calcutta.....Rs.	„ 29	63,240	66,960	31	2,018,893 +	91,941
Cape Town	June	...	12,920	...	...	...
Carthagena & Herrerias..	July 30	2,157	2,371	30	18,740 +	5,935
Cordoba	May	14,494	14,868	9	28,921 +	818
East India	July	2,231	2,220	52	25,370 +	1,586
Hong Kong .....$	July 1	11,218	15,226	29	355 626 +	78,487
Kalgoorlie	May	3,269	2,921	21	12,437 —	1,035
La Plata	July	4,054	3,909	31	29,835 +	15
Lima	Apr.	31,633	33,556	18	134,629 +	5,614
Lisbon .....Escu.	June	...	202,451	...	...	...
Madras .....(2 weeks)	July 31	30,490	32,762	30	437,111 +	31,700
Manila .....$	Apr.	117,450	124,350	...	505,381 +	16,765
Manaos .....Rs.	May	...	152,554	...	...	...
Melbourne	May	...	69,275	...	...	...
Montevideo	July	25,161	25,220	39	266,288 +	14,435
Pernambuco	July 30	2,803	2,917	30?	89,108 —	5,398
Peruvian .....$	June	759,374	929,500	52	9,763,497	+1,403,792
Port Elizabeth	June	...	2,809	...	...	...
Rangoon	June	4,997	4,205	26	28,581 —	1,164
Shanghai .....$	June 19	26,314	29,017	...	...	...
Singapore .....$	June 17	11,799	12,927	24	297,253 +	33,924
Toronto.....$	June	787,558	884,491	26	5,335,199 +	525,136
Winnipeg	June	255,549	254,686	26	1,701,474 —	50,784

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	Latest Return. 1916	Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Incr. or Dec.
Aberdare	July 25	£338	£411	+ 73	17	£6,351	+ £464
Aberdeen Corporation...	„ 26	1,884	2,267	+ 383	8	15,395	+ 96
Accrington Corp.....	„ 26	649	667	+ 18	17	9,914	+ 283
Ayr Corporation	„ 29	628	710	+ 82	11	5,066	— 330
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.....	„ 30	1,459	1,673	+ 214	17½	26,331	+ 2,104
Birmingham Corp.	„ 29	14,285	17,145	+ 2,860	17	281,498	+ 49,317
Do. Motor Omnibuses	„ 29	865	1,172	+ 307	17	16,527	+ 1,921
Blackburn Corp.	„ 26	1,561	1,648	+ 87	17½	22,869	— 459
Blackpool & Fleetwood.	„ 16	1,586	1,822	+ 236	30	19,587	+ 1,744
Blackpool Corp.	„ 27	2,748	3,718	+ 970	17	31,080	+ 5,792
Bolton Corporation.....	„ 30	2,887	3,083	+ 196	18	50,522	+ 2,742
Bournemouth Corp.....	Aug. 2	2,926	2,775	— 151	18	40,465	+ 1,530
Bradford Corporation ...	July 29	7,748	7,679	— 69	17	117,656	+ 330
Brighton Corporation ...	„ 30	1,512	1,543	+ 31	17½	20,886	+ 1,323
Bristol	„ 28	10,179	11,415	+ 1,236	30	292 586	+ 11,690
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	„ 29	1,662	1,799	+ 137	18	30,761	+ 1,143
Burton-on-Trent Corp...	„ 30	322	292	— 30	17	4,578	— 543
Bury Corporation.....	„ 30	1,429	1,554	+ 125	18½	25,525	+ 879
Cardiff Corporation.....	„ 22	2,828	3,139	+ 311	16	47,494	+ 2,745
Chatham & District.....	„ 27	1,317	1,396	+ 79	30	34,946	+ 1,279
Chesterfield Corp.	„ 20	269	272	+ 3	16	4,459	+ 157
Colne Corporation	„ 24	234	264	+ 30	...	...	...
Cork Electric	„ 27	551	619	+ 68	30	14,747	— 82
Croydon Corporation ...	Apr. 28	1,726	1,403	— 323	4	5,417	— 666
Derby Corporation	July 22	1,087	1,162	+ 75	16½	18,232	+ 801
Dover Corporation	„ 15	343	338	— 5	15	4,747	— 20
Dublin & Lucan	„ 28	158	204	+ 46	4	752	+ 74
Dublin United	„ 28	6,073	7,629	+ 1,556	30	173,427	— 6,822
Dundee City	„ 26	1,550	1,480	— 70	10⅝	14,327	+ 38
East Ham Corporation	„ 29	1,321	1,414	+ 93	17½	22,870	— 23
Exeter Corporation.....	„ 22	417	467	+ 50	17	6,636	— 74
Glasgow Corporation	„ 29	19,951	23,153	+ 3,202	8⅜	197,248	+ 16,049
Glasgow Subway.....	„ 29	864	980	+ 116	30	35,105	+ 3,747
Glossop (U. Elec. Supp.)	„ 29	141	161	+ 20	31	4,188	+ 449
Halifax Corporation.....	„ 25	2,350	2,630	+ 280	16½	37,924	— 159
Do. Motor Omnibuses	„ 25	55	55	nil	16½	791	— 73
Hastings & District.....	„ 28	1,199	1,321	+ 122	30	27,243	+ 854
Huddersfield Corp.	„ 29	2,893	3,380	+ 487	17	47,876	+ 4,206
Hull Corporation	„ 29	3,121	3,238	+ 116	17	53,768	+ 221
Ilford U.D.C.	„ 29	677	741	+ 64	17	12,634	+ 618
Ilkeston Corporation ...	Aug. 2	171	159	— 12	18	2,475	+ 75
Ipswich Corporation	July 29	675	567	— 108	17	9,405	+ 64
Isle of Thanet	„ 29	738	573	— 165	43	12,852	— 2,364
Kilmarnock Corp.	„ 29	239	228	— 11	10⅝	1,891	— 97
Lanarkshire	„ 27	1,973	2,676	+ 703	30	67,120	+ 10,222
Lancashire United	„ 26	1,919	2,163	+ 244	30	52,273	+ 1,700
Leeds City.....	„ 29	9,465	10,905	+ 1,440	18	169,277	+ 14,170
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	„ 29	826	1,043	+ 215	10⅝	9,543	+ 831
Leyton U.D.C.....	„ 27	1,662	1,828	+ 166	17	28,376	+ 210
Liverpool Corporation...	„ 29	14,421	15,665	+ 1,244	30½	416,130	+ 18,060
Llandudno & Colwyn B.	„ 21	538	554	+ 16	33½	9,358	— 223
London County Council	„ 19	46,999	48,584	+ 1,585	15½	755,621	+ 98,068
London Genl. Omnibus	*	...	...	...	...	...	...
London United.....	*	...	...	...	...	...	...
Lowestoft Corporation...	June 10	188	132	— 56	35½	4,642	— 1,379
Maidstone Corporation..	July 27	235	226	— 9	17	3,685	— 120
Manchester Corp.....	„ 31	18,221	20,477	+ 2,256	17	297,032	+ 36,996
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	„ 29	230	258	+ 28	17½	3,744	+ 280
N'castle-on-Tyne Corp.	„ 22	6,642	7,125	+ 483	16	105,345	+ 3,884
Newport (Mon.) Corp....	„ 29	862	1,009	+ 147	17	15,883	+ 1,073
New St. Helens & Dist.	„ 26	1,108	1,289	+ 181	4	4,240	+ 68
Northampton Corp.....	„ 28	796	738	— 52	17	11,873	— 1,486
Nottingham Corp.....	„ 27	3,770	4,150	+ 380	17	65,261	+ 373
Oldham Corporation ...	„ 30	2,427	2,702	+ 275	20	46,110	+ 2,691
Portsmouth Corp.....	„ 29	2,899	3,319	+ 420	18	47,652	...
Preston Corporation.....	„ 26	998	1,132	+ 134	16⅝	18,217	+ 1,839
Provincial.....	„ 29	2,623	2,913	+ 290	43	95,205	+ 5,162
Reading Corporation.....	„ 20	814	843	+ 29	15⅝	13,026	+ 451
Rhondda Tramways.....	„ 20	1,192	1,339	+ 147	29	35,649	+ 2,114
Rochdale Corporation...	„ 29	1,945	2,085	+ 140	17½	31,700	+ 832
Rotherham Corp.....	Aug. 2	1,425	1,660	+ 235	17½	26,294	+ 5,923
Salford Corporation.....	July 31	5,587	5,945	+ 358	17½	97,470	+ 4,901
Sheffield Corporation....	„ 30	9.126	10,991	+ 1,865	18½	189,037	+ 31,412
Southampton Corp.....	„ 26	1,519	1,838	+ 319	16½	27,048	+ 1,913
Southend-on-Sea Corp...	„ 26	874	1,146	+ 272	17	14,352	+ 439
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.....	„ 29	877	992	+ 115	17½	14,115	+ 406
Sunderland Corp.....	„ 30	1,647	1,985	+ 338	17	27,916	+ 1,580
Sunderland District....	„ 19	592	647	+ 55	38	22,126	+ 1,157
Swindon Corporation ...	„ 12	206	201	— 5	14½	2,929	— 12
Torquay Tramways.....	„ 27	605	763	+ 158	30	15,544	+ 530
Tyneside Trys. & Tmrds.	„ 19	675	703	+ 28	3	1,867	— 104
Wallasey Corporation ...	„ 29	1,576	1,779	+ 203	17½	23,746	+ 738
Walsall Corporation.....	„ 29	783	859	+ 76	31	24,289	+ 2,620
Walthamstow U.D.C....	„ 29	998	1,247	+ 249	17	18,837	+ 2,477
Warrington Corp.....	„ 20	471	477	+ 6	16	7,685	+ 509
West Ham Corporation	„ 27	3,108	3,386	+ 278	16½	55,281	+ 2,252
Wigan Corporation	„ 27	1,578	1,763	+ 385	17	28,281	+ 1,695
Wolverhampton Corp....	*	...	...	...	...	...	...
Yorkshire (W. Riding)...	„ 30	1,776	1,980	+ 204	31	52,923	+ 4,722

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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

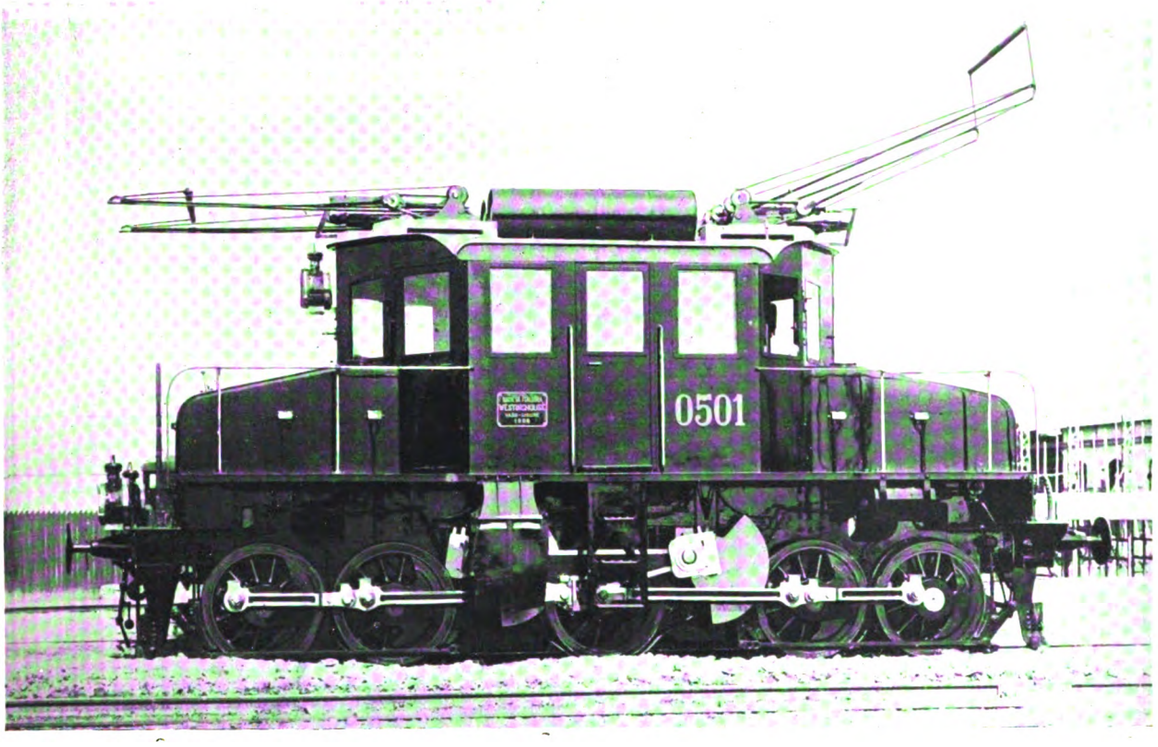
Founded 1892. LONDON, AUGUST 10, 1916. VOL. XL.

ELECTRIC TRACTION ON THE ITALIAN STATE RAILWAYS.

Like all countries which do not possess indigenous supplies of coal, Italy has for a long time found it necessary to import enormous quantities of coal for all purposes, estimated in ordinary times at about 11 million tons, and of this total not less than 2½ million tons are required for the railways. The question therefore of regular supplies at a steady price is of the highest importance to the Italian railways, and since such a happy working condition is practically impossible to secure (in view of constant fluctuations both in pit mouth prices and in freight rates), it is not to be wondered at that the Italian railway managements should seek an alternative source of motive power, either in the *houille blanche* of waterfalls or *combustible liquide* of heavy fuel oils, such as petroleum residues and similar products. The last named, however, are still of foreign origin, and therefore subject to some of, if not all, the difficulties attending the use of coal or patent fuel; but the possible employment of water power on the spot or in the near locality is so comparatively easy—especially in Northern Italy—that it is not surprising to find throughout that region of the country some striking developments in electric traction based on hydro-electric power plants with high voltage transmission lines.

Out of the 14,000 kilometres of railway line in Italy the existing distance thus operated by electricity is only some 350 kilometres, and these lines have naturally been chosen in the most suitable directions, being, moreover, the product of slow development in feeling the way towards new methods. Nevertheless the equipment of these lines, amounting to one-fortieth only of the total length of railway in the country, has led to the saving of nearly one-fifteenth of the coal consumed hitherto on the railways, while naturally the working and travelling conditions have been greatly improved all round. This may be shown, for instance, by one single detail in regard to possible train density.

Many of the lines have extremely severe grades owing to the hilly districts traversed; on one section near Genoa the daily car capacity has been increased by 33 per cent. by the adoption of electric working.



O-E-O Type Electric Locomotive—Italian State Railways.

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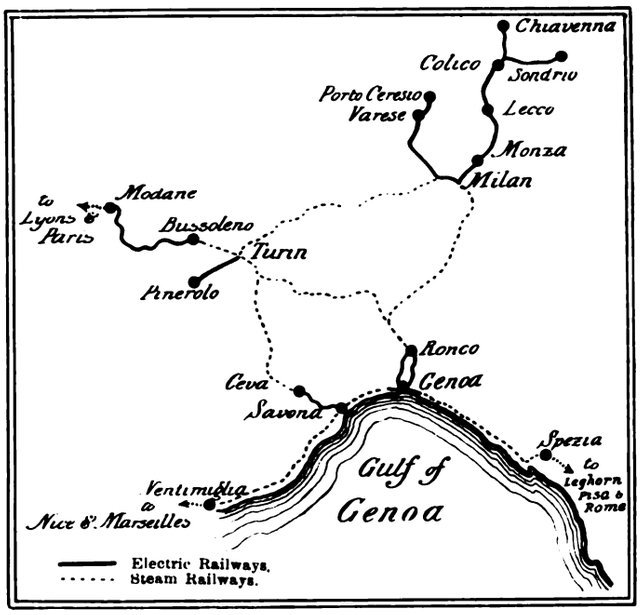
On another section the daily capacity is now double what it was with steam traction. Moreover, the great number of tunnels on these lines is a factor of supreme importance in favour of electric equipment instead of employing steam locomotives.

The lines at present worked by electricity are, as will be seen from the accompanying sketch map, all



situated in the Northern provinces of Italy, with the three great cities of Milan, Turin, and Genoa as their approximate centres.

Extensions of this method of working must inevitably tend to connect up all these various isolated lines into one comprehensive network; but such a radical change—involving the outlay of large amounts of capital on construction work—must necessarily take many years to complete. Yet even with an enlargement to 2,000 kilometres in the total length of electric lines (including the new Rome-Naples through express route along the coast, and the equipment of the present lines from Genoa to Spezia and to Ventimiglia, which are this coal at home in the various works that might find at least some occupation in supplying the Italian railways with such electric plant and material as they cannot conveniently or economically produce in Italy.

As already stated, the Italian electric lines now at work or under equipment group themselves into three divisions, as follow:—

I.—Milan: (*a*) Milan-Varese-Portoceresio. (*b*) Milan-Monza-Lecco-Colico and Colico-Chiavenna Colico-Sondrio.

II.—Turin: (*a*) Turin-Pinerolo. (*b*) Bussoleno-Modane (including the Mont Cenis tunnel).

III.—Genoa: (*a*) Ronco-Busalla-Genoa. (*b*) Giovi-Genoa. (*c*) Savona-Ceva.

In the sketch map are shown in dotted lines the further main line tracks stretching from the French frontier at Ventimiglia through Savona and Genoa to Spezia, which it is proposed to equip as soon as possible, and the existing steam track connections between Milan, Genoa, and Turin are also represented in broken lines to show how all the three groups might eventually be combined into one comprehensive system.

In connection with these developments of electric traction upon the Italian State Railways, there are, of course, many points of great interest, but we can here allude only to two important features which deserve special attention. These are, first, the question of power supply, and, secondly, the locomotive equipment. For the particulars we are mainly indebted to the *Rivista Tecnica* of the Italian State Railways.

Ten years only have elapsed since the present State railway administration was constituted, and at that date the above groups numbered but two, and comprised merely the lines from Milan to Varese, Varese to Porto Ceresio (worked on the continuous current third rail system at a pressure of 650 volts in the contact rail)—these lines forming what are known as the "Varesine" service—and the lines from Lecco to Sondrio and Chiavenna through Colico, called the "Valtelline" service. This latter has throughout been operated on a three-phase high-tension system at 3,000 volts line pressure, 15 cycles per second.

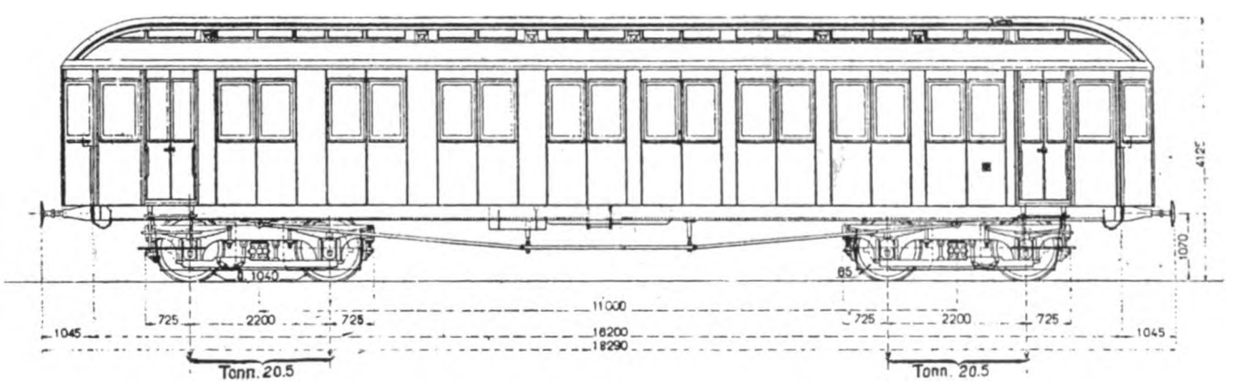


Fig. 1.

very largely in tunnel throughout), the electrically equipped lines, amounting to one-seventh of the total length in the country, would reduce the quantity of coal to be imported by at least one million tons, or, say, 40 per cent. of the railways entire annual consumption.

Much as this would appear to militate against British trade in coal with Italy, it is a movement that ought to have the strongest support in this country, for obviously it would be more to our advantage to use

Figs. 1 to 4 inclusive illustrate the locomotive rolling stock employed in the Varesine section, being used for passenger traffic only; for goods trains, steam locomotives continued to be employed.

On the Valtelline section both goods and passenger traffic were carried on by means of the electric service, and in Figs. 5 to 8 inclusive are shown examples of the locomotive stock employed—all from the works of Ganz & Co., Buda Pesth, and built during 1902-4. The Varesine locomotives and motor coaches were

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built in Milan, so far as their mechanical structure was concerned, the General Electric Company, of Schenectady, New York, being responsible for the electrical equipment. These latter date from 1901 to 1904.

The Varesine section was at first operated from a steam power-house situated at Tornavento, with a normal capacity of 2,000 KW. only; but this plant, being quite insufficient to cope with the growing traffic (though latterly used only for the section Milan-Varese), was closed altogether in 1912; and current for this section was then purchased from a local electric power company which had installed a hydro-electric power-house using waterfalls at Varzo. The other section—Varese to Porto Ceresio—was fed similarly with energy purchased from another power company controlling several hydro-electric stations (Cunardo, Maccagno, and Delio).

In the same year (1912) five additional and much more powerful locomotives were built by Messrs. Brown, Boveri and Company, and put into service on the Varesine section; these are represented by Fig. 9. They enabled the administration to keep pace with the great increase of traffic, and dispensed altogether with the need for steam trains in addition.

The Valtelline section was, until last year, operated by current from a hydro-electric station at Morbegno, where three units each of 1,250 KW. were installed, but as the traffic often required the use of all three units without reserve, another hydro-electric plant installed at Robbiate was called into service. The original four-motor Ganz locomotives of type 1—C—1 (Fig. 8) were added to in 1906-7 by several new ones of larger capacity (1,250 KW. each), with three synchronous running speeds (26, 42, and 64 kilometres per hour). These latter were modified in 1912-13, some of them (shown in Fig. 10) having two motors only, but the

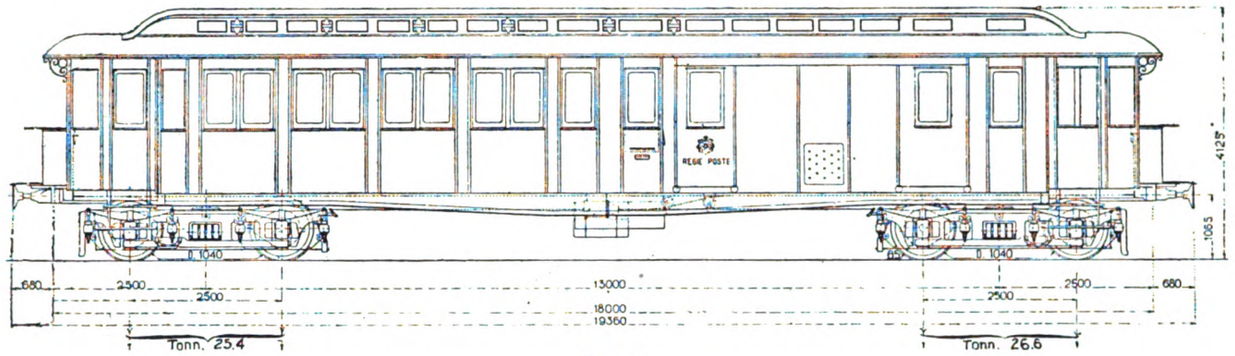

Fig. 2.

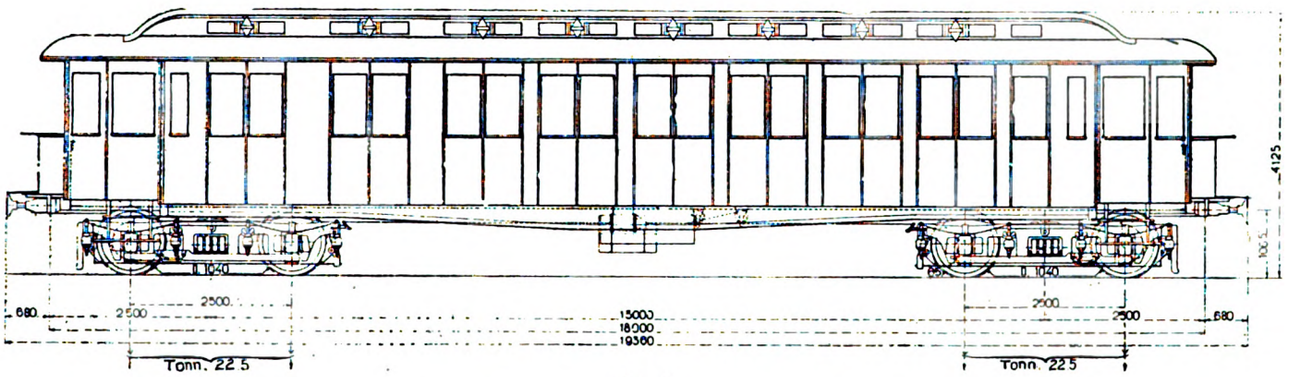

Fig. 3.

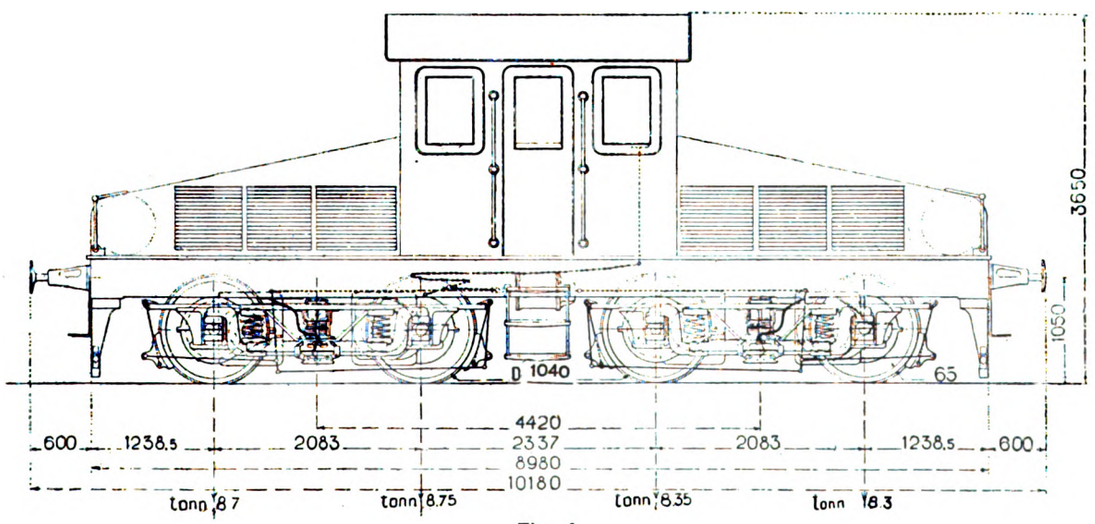

Fig. 4.

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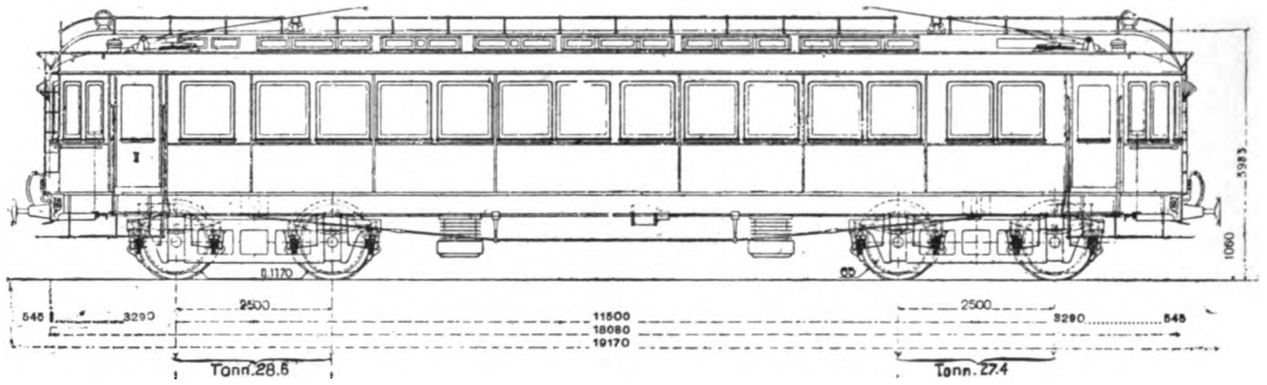

Fig. 5.

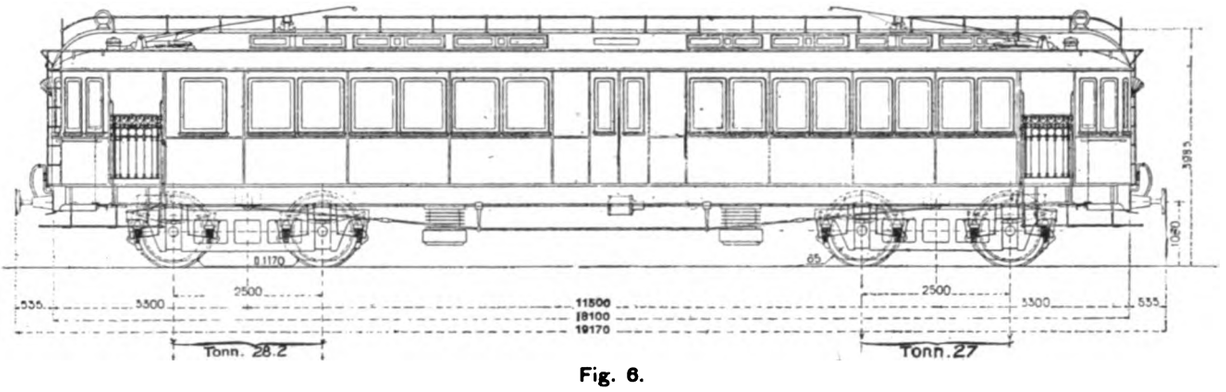

Fig. 6.

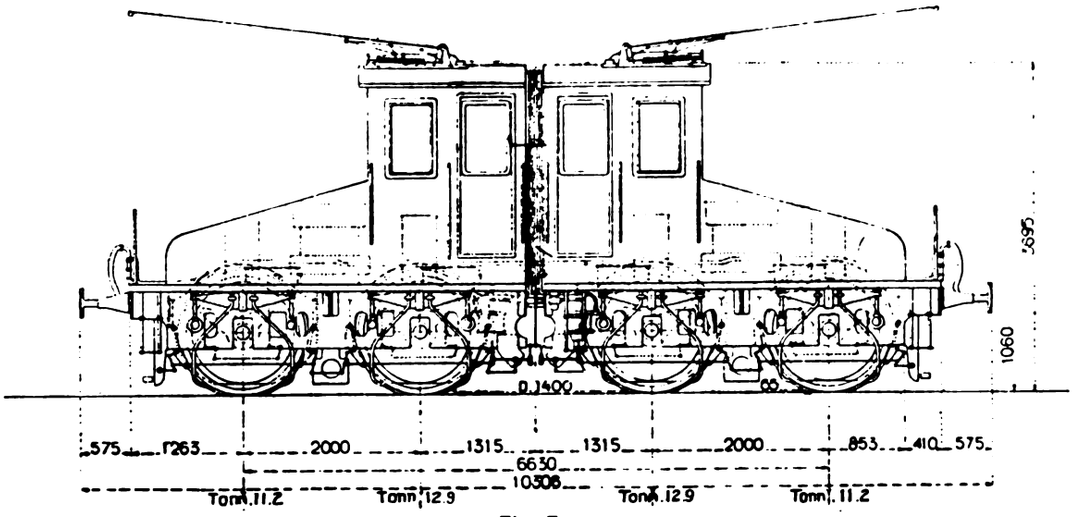

Fig. 7.

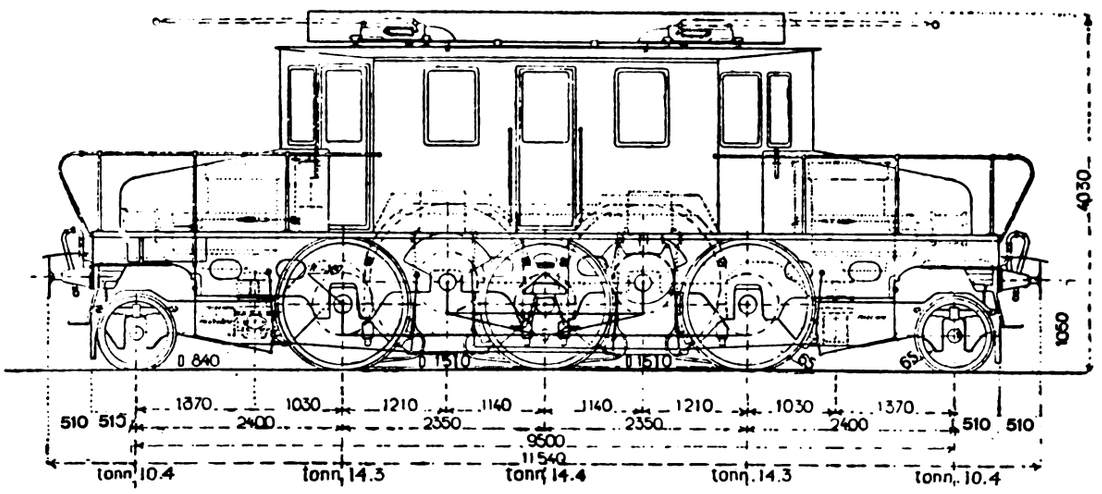

Fig. 8.

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same capacity (1,250 KW.), and two synchronous running speeds—32 and 64 kilometres per hour. The others (represented by Fig. 11) were similarly each of two-motor equipment, with a capacity of 800 KW. and running speeds of 21 and 42 kilometres per hour.

Still further developments were made at the same time on this section with locomotives of 0—E—0 type (Fig. 12) that were originally designed for the Giovi-Genoa line. These latter had also each a double motor equipment with a joint capacity of 1,500 KW., all the five axles being coupled. It will be noticed by the way that the Italian railways classify their electric locomotives by indicating the axles instead of the wheels as is the case in this country, at any rate in regard to steam locomotives. The intermediate letter refers, of course, to the combination of electric motors and mechanical coupling—the entire system or method of classification being somewhat as shown in the following table :—

LOCOMOTIVE ROLLING STOCK.

Vehicle.	Type.	No. of Motors.	No. of Loco. Axles.	Remarks.
Motor coaches	0 – 4 – 0	Four	Four	Motor geared to each axle.
,, ,, ...	1 – 2 – 1	Two	Four	Motor geared to one axle of each bogie.
,, ,, ...	1 – 2 – 1 (Motors in parallel) 0 – 4 – 0 (Motors in series)	Four	Four	Motors mounted on loco. axles; hollow axle drive; articulated parallelogram side rods.
Locomotives	0 – 4 – 0	Four	Four	Motor geared to each axle.
,, ...	0 – B : B – 0	Four	Four	Motors mounted on loco. axles; hollow axle drive; articulated parallelogram side rods.
,, ...	1 – C – 1	Four	Five	Coupling rods from motor axles to three coupled loco. axles.
,, ...	0 – E – 0	Two	Five	All five locomotive axles coupled.

Of the 0—E—0 type of locomotive not less than 15 were put into service in 1911 on the first section of line near Genoa to be converted to electric traction—that between Pontedecimo and Busalla, the current for which was obtained from a steam power-house situated in a large quarry outside Genoa. This plant had a working capacity of 10,000 KW., with a reserve of the same amount.

These locomotives, as with those of similar type on the Valtellina line, operate on two running speeds, according as the motors are grouped in series or parallel; but the later examples have considerable improvements in their electric equipments which are much lighter in proportion to their capacity, being fitted each with two motors only, while the original Valtellina locomotives had four.

Still more powerful machines (shown in Fig. 13) of the 1—C—1 type were provided by the Italian Westinghouse Company during the year 1914 for working the completed lines round Genoa on the important main loop section to Ronco, where the traffic from the port up country reaches a maximum, and where the grades against the load are extremely heavy, while numerous tunnels made it almost impossible to carry on the service with steam locomotives using briquettes for the most part.

This latest type of locomotive has a capacity of not less than 2,000 KW. from two motors only, their axles being coupled to the three loco. coupled driving axles by the usual triangular frame connecting rod on each side. Four speeds are provided—35, 50, 70, and 95 kilometres per hour. These locomotives weigh about 73 tons each.

The 0—E—0 type, weighing about 60 tons, with a capacity of 1,500 KW. (frequency 15 cycles), and running speeds of 22·5 and 45 kilometres per hour, have shown themselves capable of hauling 190 tons each on grades of 3·5 per cent. between Pontedecimo and Busalla, where the ruling gradient is 2·7 per cent.

Energy supply for this section is now obtained from the Maira Hydraulic Power Company and from R. Negri's Riviera di Ponente Electric Company, both these concerns making use of large water powers in the Ligurian Alps. The voltage now employed is, however, 3,600 instead of 3,000, as at first, and the frequency 16·7 cycles instead of 15. This has raised the running speeds to 25 and 50 kilometres per hour respectively. The steam power plant at Genoa is now kept solely as a reserve or stand-by, the frequency of the plant being raised so that on emergency it can be operated in parallel with the supply purchased from the power companies.

The Modane-Bussoleno section—part of which was operated by electric locomotives so long ago as in 1912—was finally completed in May of last year only; and the importance of this line is enhanced by the fact that it includes the well-known Mont Cenis tunnel (or the Fréjus tunnel, more strictly speaking), about 8½ miles long. At first this section was worked with current provided by the city of Turin's electric plant, at a pressure of 50,000 volts and frequency of 50 cycles, which was reduced at sub-stations for line distribution to 3,500 volts and 16·7 frequency; later on the Maira Hydraulic Power Company furnished current at 65,000 volts, reduced to the same line voltage at six sub-stations through static transformers, a rotary transformer station at Bardonnechia (the Italian side of the Mont Cenis tunnel) being closed down and a new static transformer station erected at Bussoleno—the present terminus of the electric section, and half way between Modane and Turin.

The short section of line from Savona to Ceva, on the important trunk line between Savona and Turin—over which passes a large amount of traffic both inwards (principally coal) and outwards to the port of Savona—has very many tunnels combined with heavy grades, so that it offers every inducement for satisfactory electric working. Twenty-six locomotives of the 0—E—0— type (Fig. 12) are employed on this section, which is fed with current purchased from the R. Negri Riviera de Ponente Electric Company. This company utilises several water powers in the district, and has a high tension distribution network with at least five sub-stations, also a steam power plant at the terminus port of Savona, on the Riviera line between Ventimiglia (Italian Mediterranean frontier) and Genoa.

On the Monza-Lecco line (the electrification of which is completed) similar locomotives are at work for goods traffic, but passenger trains are drawn by sixteen of the more powerful type, 1—C—1, shown in Fig. 13. These machines have a weight of 73 tons,

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of which from 45 to 51 tons are available for adhesion. They have four running speeds, 37·5, 50, 75, and 100 kilometres per hour, with corresponding tractive efforts of 9 tons, 9 tons, 9·5 tons, and 6 tons. At 75 kilometres per hour the capacity of the locomotive is 2,000 KW. The different running speeds are obtained by commutation of the poles, and connecting up the motors in series or parallel.

As stated, each locomotive has only two motors, and the motor stators are provided with a single winding.

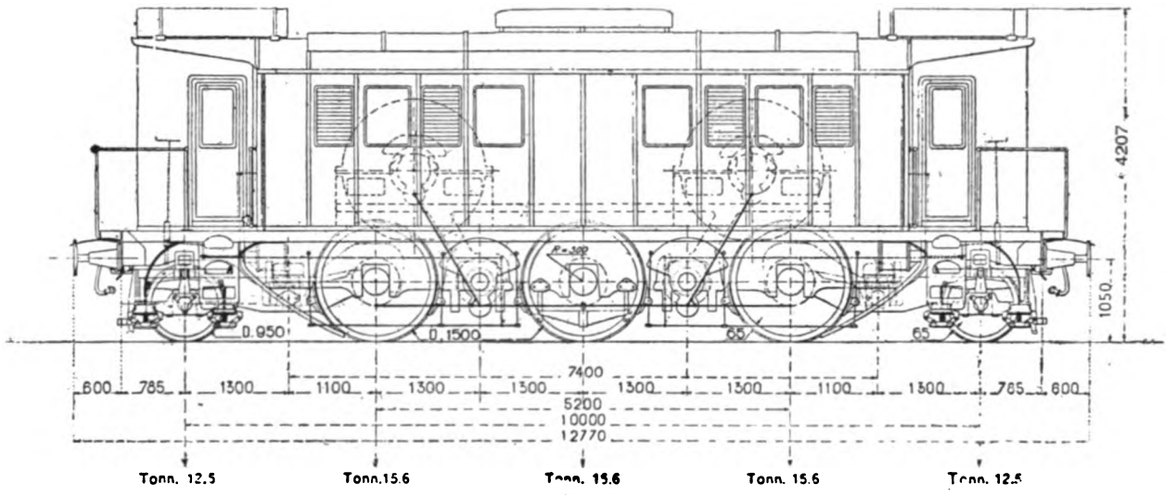

Fig. 9.

Other novel features to be noted in connection with the electric equipments are the following :—

1. The rotating fields of the stator of one traction motor are arranged so as to be in perfect phase accordance with that of the stator of the other traction motor.
2. Transmission of motive effort from the rotor axles to the locomotive driving axles by special triangular-shaped connecting rods, which enable high speeds to be attained.
3. A watt metric regulation, which permits running at constant power while still leaving the driver free to vary the value of such power according to need, the running being unaffected by inevitable variations of tension in the trolley wires.

It is interesting to note that the earlier triphase locomotives (Fig. 8) had a capacity of 9·4 KW. per ton weight, whereas the later type (Fig. 13) have a capacity of no less than 26 KW. per ton of total weight. Further note of progress in design is shown in the fact that the former had only two running speeds, whereas the latter has four.

Summing up the results of these ten years' working of electric traction on the various sections of the Italian State Railways now outlined, it may be said that the motor coaches and locomotives have shown themselves throughout perfectly well fitted to carry out all the duties of steam locomotives, and have moreover done other things for which they were not designed. Their special advantages have, of course, been great speed of acceleration, high specific power, more adhesion weight, or, perhaps, rather the better utilisation of the adhesion weight, and, lastly, their ability to draw heavy loads up steep grades at high speeds. The further advantage of doing away with smoke and fumes is of inestimable importance on lines such as the Mont Cenis, the Savona-Ceva, and the Genoa district sections, where there are numerous long tunnels. Moreover, on the descent of these grades the traction motors exert a recuperative effect on the distribution circuit by acting as generators, saving not only the current consumed but also the train brake gears and parts, although, of course, these latter are not in any way rendered unnecessary.

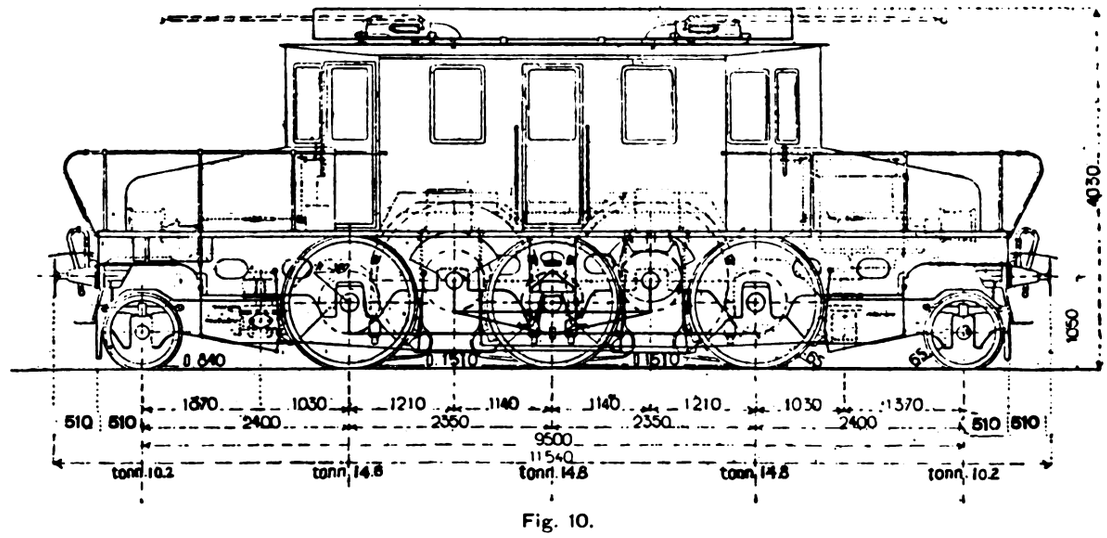

Fig. 10.

Although a triphase system does not permit of great variations in the feeding pressure, it has yet been found that the locomotives work quite satisfactorily at pressures from 2,700 to 3,700 volts, and with frequencies of 14 to 18 cycles.

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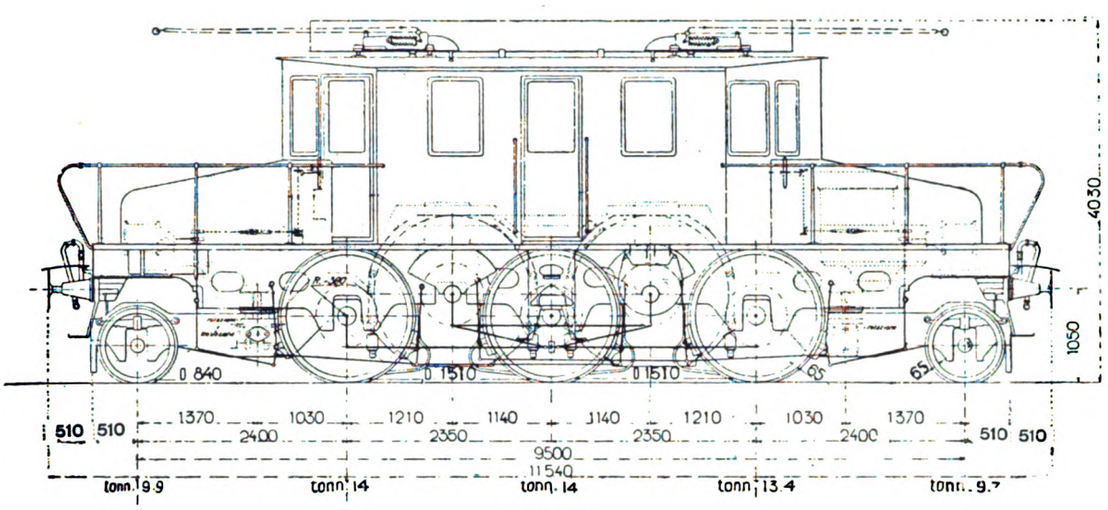

Fig. 11.

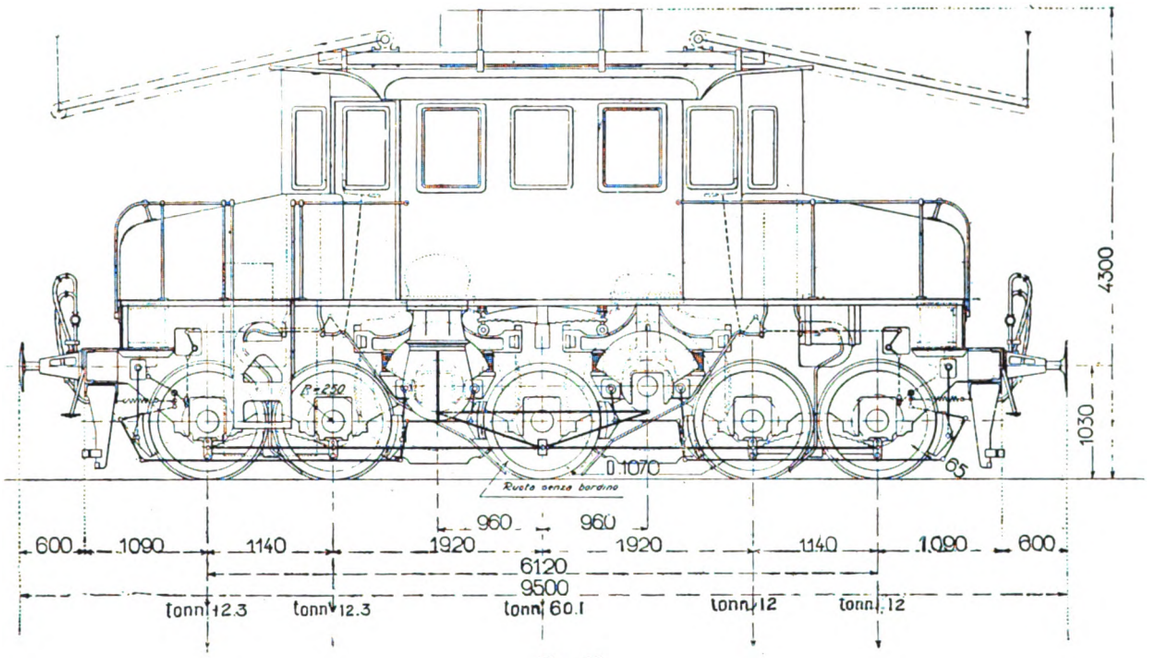

Fig. 12.

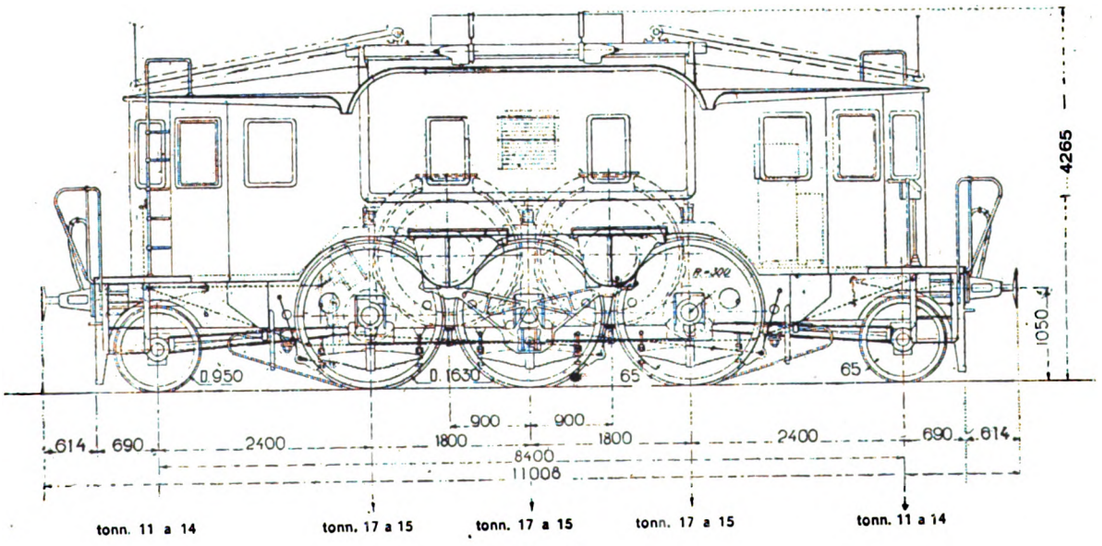

Fig. 13.

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Electric locomotives are admittedly more complicated and delicate than steam locomotives, and require more care and perfection of building and running if only from the small defects which may lead to serious trouble. For instance, a slight want of parallelism in the transmission rods, or hollow axles; the wear of bearings which reduces the small air gap between stator and rotor on one side only of the circumference and perhaps sets up actual contact; or, again, there may be electrical defects in the switch or regulating appliances, but thanks to an efficient staff, both for running and maintenance, no more serious breakdowns in the service have taken place than with steam traction, while the annual cost of repairs has certainly been reduced in proportion.

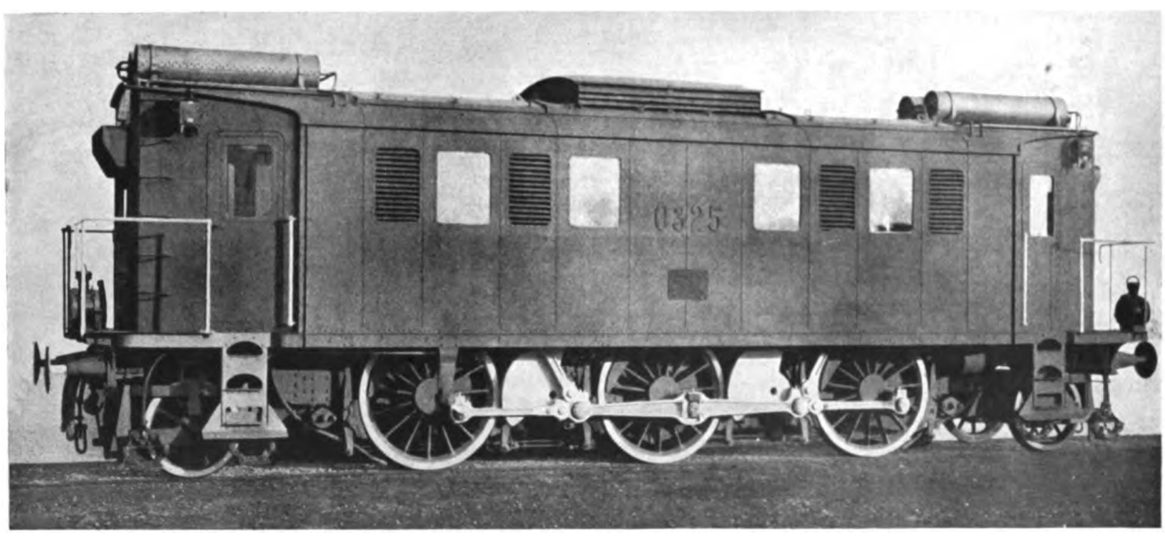
Outside interruptions have been due to natural causes, such as destruction of water canals, heavy snowstorms, or unroofing of buildings by gales, all of which have influenced the power supply for short periods on two or three occasions, but now that linking up of high tension mains over this part of Italy has been carried out, together with the provision of stand-by steam plants, there need be no further expectation of water power electric supply altogether failing and interrupting the service.

Breakdowns due to defective contact rails have only occurred on two occasions on the Milan-Varese line for one day and two days respectively, in the winters of 1906 and 1914, when ice formed on the rails and contacts. There seems to have been no difficulty at all in this connection with the overhead trolley wires of the sections worked with high tension alternating three-phase current.

In general the results, bearing in mind that they represent the working of the first ten years of heavy electric traction, appear so favourable that there seems

PARTICULARS OF ELECTRIC LOCOMOTIVE ROLLING STOCK—ITALIAN STATE RAILWAYS.

	Type.	No. of Traction Motors.	Capacity Total (kw.).	Gear Ratio.	Transmission.	Total weight, tons.	Adhesion weight, tons.	Max. speed km. per hour	Tractive effort in tons.	Passengers carried.	Type of brakes.	Date when built.	No. at work.
I.—Continuous Current: 600 volt													
A—Motor Coaches—													
Fig. 1	0-4-0	4	440	26:51	Toothed gear.	41	41	95	1·8 at 80 kms. per hour	73	Automatic Westinghouse	1901	20
Fig. 2	0-4-0	4	550	17:80	,,	52	52	60	3·25 at 46 kms. per hour	40 plus mails and baggage	,,	1903-4	5
Fig. 3	1-2-1	2	220 each	26:51	,,	45	23·6	95	·9 at 80 kms. per hour	76	,,	1903-4	16
B—Locomotives-													
Fig. 4	0-4-0	4	440	17:56	,,	34	34	60	3·25 at 46 kms. per hour		,,	1901	1
Fig. 9	1-C-1	2	1,200	—	lay shafts and connecting rods	71·8	46·8	100	5·1 at 80 4·0 at 100	—	also Henry ,,	1912	5
II.—Alternating Current: 3-phase 3,000-3,600 volts: 15-16·7 cycles.				Max. speed of synchronism revs. per min.									
A—Motor Coaches—													
Fig. 5	1-2-1 0-4-0	4	440	300-334	hollow axles and articulatd side rods	56	28 parallel 56 cascade	73·4	2·4	24 plus baggage	Automatic Westing-	1902	5
Fig. 6	1-2-1 0-4-0	4	440	300-334	,,	55·2	27·6 parll. 55·2 casc.	73·4	2·4	56 plus baggage	,,	1902	5
B—Locomotives-													
Fig. 7	0-B:B-0	4	440	128-141	,,	48·2	48·2	36·7	4·8 at 33 kms. per hour	—	,,	1902	2
Fig. 8	1-C-1	4	600	225-250	triangular side rods	63·8	43	71·2	3·5 at 64 kms. 6·5 at 32 kms.	—	,,	1904	3
Fig. 10	1-C-1	2	1,250	225-250	,,	64·6	44·2	71·2	6·8	—	,,	1906-7	2
Fig. 11	1-C-1	2	800	150-167	,,	61	41·4	46·8	6·8	—	,,	1907	2
Fig. 12	0-E-0	2	1,500	225-250	,,	60·5	60·5	50	12	—	,,	1908-15	130
Fig. 13	1-C-1	2	2,000	334	,,	73	51	100	9 at 37·5 9 at 50 9·5 at 75 6 at 100	—	,,	1914	16



1-C-1 Type Electric Locomotive—Italian State Railways.

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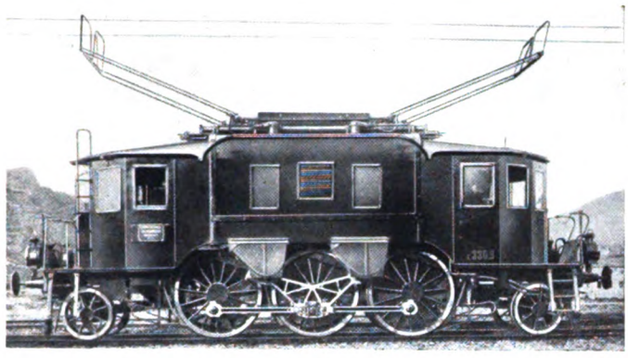
every expectation of further developments now that the experimental period of failures and mistakes has passed by; these developments will not and cannot be rapid, but it would seem only fair to think that the next twenty years will see a complete network established in the north-western parts of Italy, where water power is abundant, traffic extremely heavy, and the local conditions (steep grades and frequent tunnels) are entirely in favour of electric working.



New 1-C-1 Type Electric Locomotive—Italian State Railways.

RAILWAYS, TRAMWAYS, AND THE DEFENCE OF THE REALM ACT.

In the Defence of the Realm (Acquisition of Land) Bill, which has passed its second reading in the House of Commons, Clause 6 makes provisions with respect to the maintenance of railways and tramways that have, for war purposes, been laid on, over, or under any public highway, and also deals with cases where any public highway has been closed. Dr. Addison (Parliamentary Secretary, Ministry of Munitions), introducing the Bill, stated that Clause 6 provided for the continuance of the use of certain light railways and sidings, subject to orders by the Board of Trade. They also had to deal with cases where they had arranged for the supply of light and power outside the area of existing authorities. Power was taken to continue the supply. The Railways and Canal Commission would deal with the questions arising under the Bill. They would have the assistance of assessors, and would be authorised to make local inquiries.

RAIL DESIGN, WEAR AND CORRUGATION.

By Robt. B. Holt
(Highways and Permanent Way Engineer, Leeds).

In articles on the Manufacture and Wear of Rails published in the issues of The Tramway and Railway World of January 6 and November 3, 1910, the writer called attention to the irregular wear which was taking place on both rails and wheel tires owing to the defects in the design of both. In these articles it was shown that whilst almost all rails, including the British Engineering Standard Sections, were designed with level plane or inclined plane treads, after a certain period in service these rails assumed a convexity of running surface of approximately 12 in. radius, and a corresponding hollow profile was acquired by the wheel treads. The writer demonstrated that a very imperfect contact was obtained between new rails with flat or inclined plane treads and worn wheels, and conversely between partly worn rails and new plane tires.

Referring to the loss of metal which results from this bad contact, the writer made the following statement :—"The wear of tramway rails is not uniform, and under the present conditions detrusion of the metal in the head commences immediately the rails are put into service. This is due to the unequal contact between the wheel and the rail, bringing immeasurable forces into play on portions of the rail head, causing an unrestrained flow of metal, which may possibly have some connection with the appearance of rail corrugation."

Fig. 1 is a reproduction of illustrations which appeared in the articles referred to, and Fig. 2 gives details of the rail designed by the writer for the Leeds Corporation Tramways, which was put into general service in 1910. As stated in The Tramway and Railway World of November 3, 1910, a very satisfactory contact is obtained between new rails of this design and worn wheel tires after about 48 hours in service.

Fig. 3 shows the contact between a new rail of this design and a worn tire. Since 1910 about 6,000 tons

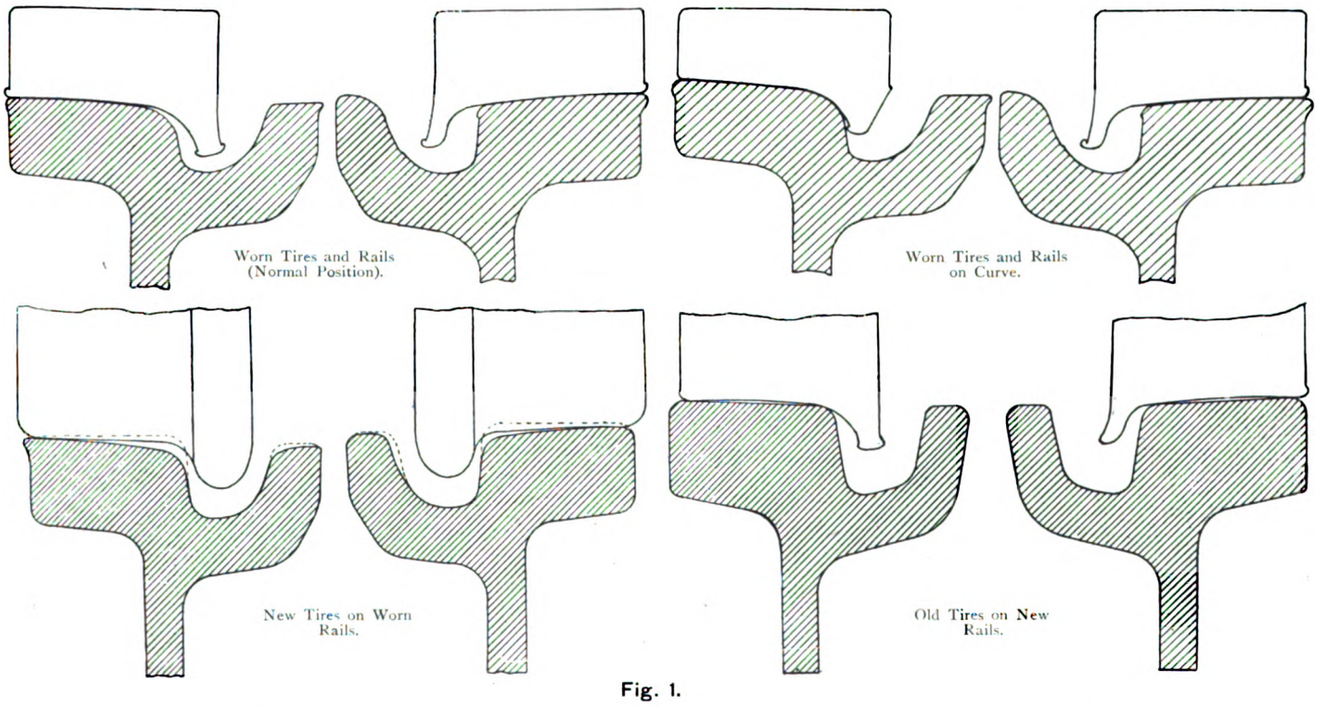


Fig. 1.

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of this rail have been used on the Leeds Tramways, and without exception a broad uniform contact has been immediately obtained. No alteration has been made in the profile of the wheel treads for, although these are inclined planes they have the same inclination as the rail tread, and new tires, being subjected to continuous wear, soon accommodate themselves to the rail tread.

It is interesting to note that many of the more important British tramway undertakings have now adopted convex rail treads, and it is reported that

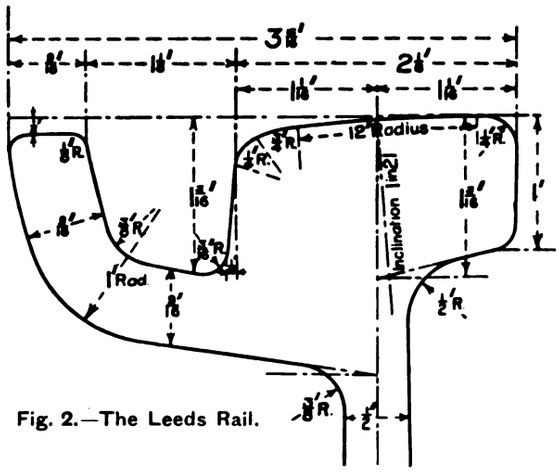

Fig. 2.—The Leeds Rail.

the British Engineering Standards Committee are contemplating alterations to their sections in this direction.

In the articles previously referred to, the writer concluded with the following observation :—" If rail corrugation is caused or accentuated by the detrusion of the metal in the rail tread, the writer suggests that rails and tires designed on the lines recommended will, by giving a better contact, lessen the tendency to either detrusion or corrugation, and will in any case

Fig. 3.—Showing Contact between Worn Tire and New Rail shown in Fig. 2.

lessen the wear on both and facilitate the progress of the car."

It appears that the question of wheel contact is also occupying the attention of American street railway engineers, and the *Electric Railway Journal* of New York, of December 25, 1915, contains a contribution by Mr. R. C. Cram, assistant way engineer to the Brooklyn Rapid Transit System, upon " Curved Heads for Girder Rails in Brooklyn." As stated by Mr. Cram, girder rails with curved heads are by no means new, and the writer is quite in agreement with his observation that " a study of actual conditions of rail and wheel tread wear leads to the belief that the inclined plane tread design was based upon a misconception of the theory of contact and was at variance with the requirements of correct design." Mr. Cram also raises the question of providing new wheels with curved treads, but like the writer he considers that whilst this is desirable it is not imperative.

The chief feature of Mr. Cram's article is in regard to the possible effect of the improved rail section with the convex tread upon rail corrugation ; it is " demonstrated that, as corrugation is caused by excessive pressure or force per unit area at the wheel tread, increasing the tread area by conforming the rail head contour to that of the worn wheel reduces corrugation," and further, " the curved head design by providing a range of contacts over new rail heads about three times that provided by plane heads and much further back from the unsupported metal near the gauge line fillet, seems to satisfy the theory of contacts as well as the conditions of wear found in service." Mr. Cram considers that " with these points in its favour it is thought that the curved head design merits the most careful investigation because of the potential value in tending to minimise the inherent tendency of all rails to corrugate." Fig. 4 is a reproduction of several illustrations from Mr. Cram's article, which are similar in essential features to those introduced by the writer in the articles referred to.

In regard to the detrusion and flow of metal in the rail tread on ordinary plane surfaced rails, Mr. Cram deduces from his investigations that owing to the imperfect contact between wheel and rail, as indicated in the diagram shown in Fig. 4, " The metal cannot do otherwise than to flow or cold roll under the extremely heavy concentrated loading produced by the conditions obtaining, and some of the metal flows forward ahead of the wheels, while some flows laterally over the gauge line fillet, where there is little or no support sideways against such action. The flow is also assisted by the increased coning of the curved wheel treads."

The writer is in accordance with Mr. Cram in regard to the lateral detrusion of the metal in the rail tread. Observations made a few days after new rails with plane treads have been placed in service reveal the formation of a beading of extruded metal near the gauge line fillet. Detrusion continues until the tread assumes the exact contour required by the car wheels. Five years' experience in Leeds, with the rail shown in Figs. 2 and 3, shows that a broad contact is immediately obtained, detrusion is entirely obviated and the rail maintains its original profile.

The writer does not consider that Mr. Cram has proved his contention that corrugation is caused by excessive pressure per unit area at the wheel tread ; and after the five years' experience referred to above with the rail shown in Fig. 2, it is evident that notwithstanding the full contact afforded by the convex tread on rails of standard quality, there is no diminution of the tendency to corrugate. Figs. 5 and 6 are photographs of corrugations on rails of this type after the passage of 523,250 and 300,000 11-ton cars respectively. These are not isolated cases ; but they are representative of the type of corrugation which is developing on rails with curved or convex treads in Leeds.

The investigations of the special committee appointed by the Municipal Tramways Association to inquire into the phenomena of rail corrugation* " showed that the occurrence of corrugation is independent of the number of cars which have passed over the rails " ; that " corrugation produced by one set of cars may be entirely removed by another set of cars running

* Interim Report "Rail Corrugation," Municipal Tramways Association.

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in place of the first. It may also be caused and removed by the same set of cars under apparently the same conditions." Another finding of this committee which is of great importance is that " corrugation appears on the rails independently of whether the wheels are being actively driven by the motors or not. The committee are of the opinion that the explanation of this may be the slip and skid taking place owing to the different diameters of the wheels, which difference between the flange of the wheel and the side of the rail head, and they occur only when the pressure at the point of maximum intensity of pressure exceeds the elastic limit of the steel at that point. Space will not allow of a recapitulation of the many well reasoned points contained in this cogent article; but it is interesting to note that the author considers that most of the corrugations can be eliminated by so designing the rail head, wheel tread, and wheel flange and so

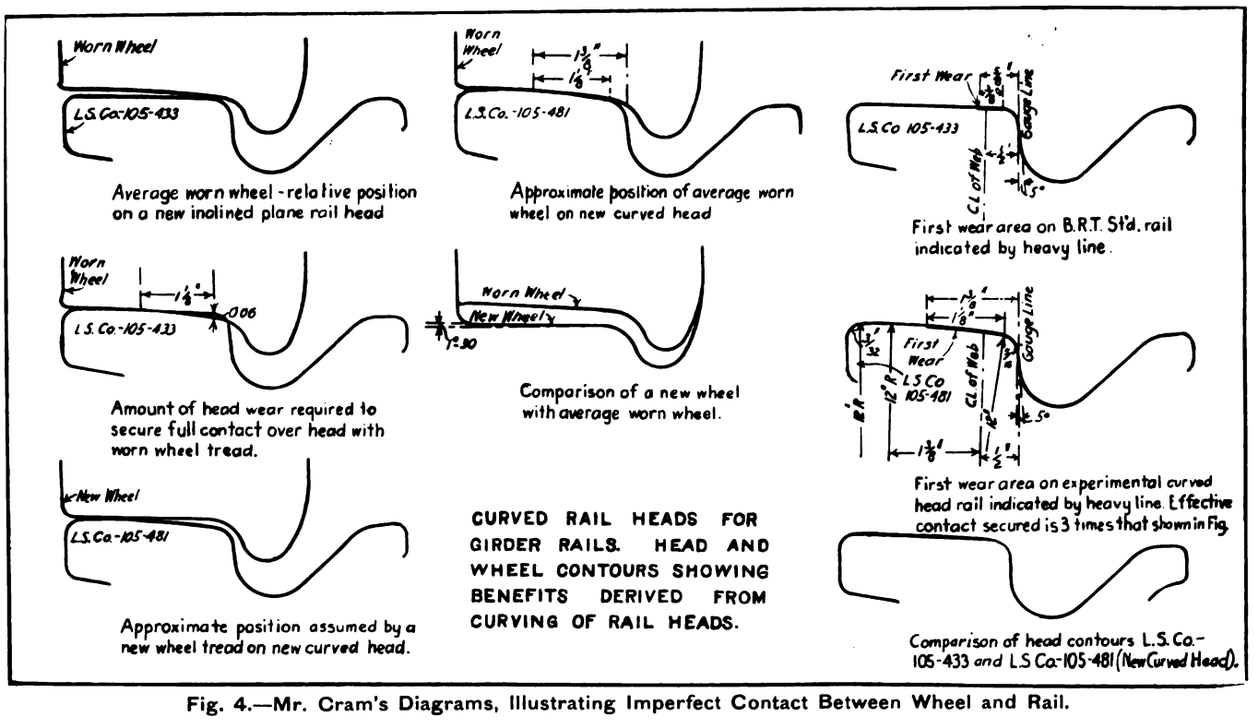
Worn Wheel
L.S.Co-105-433
Average worn wheel - relative position on a new inclined plane rail head
Worn Wheel
L.S.Co.-105-481
Approximate position of average worn wheel on new curved head
First Wear
Gauge Line
L.S.Co 105-433
C.L. of Web
First wear area on B.R.T. Std. rail indicated by heavy line.
Worn Wheel
L.S.Co-105-433
.006
Amount of head wear required to secure full contact over head with worn wheel tread.
Worn Wheel
New Wheel
Comparison of a new wheel with average worn wheel.
First Wear
L.S.Co 105-481
Gauge Line
C.L. of Web
First wear area on experimental curved head rail indicated by heavy line. Effective contact secured is 3 times that shown in Fig.
New Wheel
L.S.Co-105-481
Approximate position assumed by a new wheel tread on new curved head.
CURVED RAIL HEADS FOR GIRDER RAILS. HEAD AND WHEEL CONTOURS SHOWING BENEFITS DERIVED FROM CURVING OF RAIL HEADS.
Comparison of head contours L.S.Co.-105-433 and L.S.Co-105-481 (New Curved Head).

Fig. 4.—Mr. Cram's Diagrams, Illustrating Imperfect Contact Between Wheel and Rail.

largely results from the unequal wear produced by the relative difference in the speed of the motors."

In their interim report the committee state that " they consider that they have ample evidence that the force or forces responsible for the reaction which results in rail corrugation are external to the rail. It is realised, however, that whilst rails rolled to any known specification are affected to a certain degree by this reaction, some are not affected to the same extent as others." " From evidence collected, coupled with the experience of the members of the committee, the committee are of the opinion that a steel for rails can be obtained which is more durable and less liable to the development of corrugation than the ordinary varieties of steel in use at present." The *Electric Railway Journal* of New York published in September, 1911, an exceedingly able article by Mr. G. E. Pelissier on " A New Theory of the Cause of Corrugation," in which the writer evolved the theory that corrugations are directly due to non-uniformity of pressure between the tread of the wheel and the surface of the rail and laying the rails that the maximum intensity of pressure will occur near the centre of the rail tread and as far as possible from the gauge line fillet.

Mr. Pelissier further considers that corrugations produced by pressures exceeding the cubical elastic limit of steel (such as might occur with quick braking of heavy, fast trains) can be eliminated only by raising the elastic limit of the steel and increasing the area of contact between wheel and rail.

It would appear that the rail designed by the writer and that recommended by Mr. Cram fulfil the conditions as to contact, which Mr. Pelissier considers to be essential for the elimination of corrugation, but the fact remains that the Leeds rails of this design (B Standard quality), as previously stated, are just as susceptible to corrugations as the rails with plane or inclined plane treads. (See Figs. 5 and 6.)

In regard to Mr. Pelissier's recommendation that the elastic limit of the steel should be raised where the pressure brought to bear upon the rail surface is excessive, and also to the opinion of the Municipal

Fig. 5.—Corrugations on Rail shown in Figs. 2 and 3 after the passage of 523,350 cars.

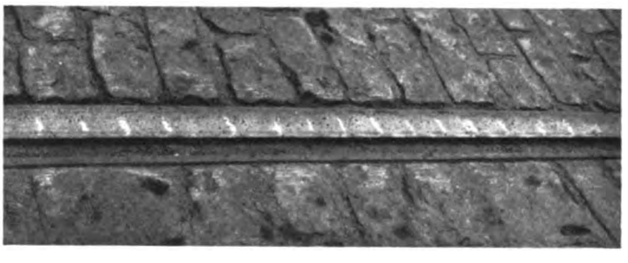

Fig. 6.—Corrugations on Rail shown in Figs. 2 and 3 after the passage of 300,000 cars.

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Tramways Association Corrugation Committee that a steel for rails can be obtained which is more durable and less liable to corrugation than the ordinary steels in use, it is evident that close attention should be given to the composition and manufacture of the steel, and in the writer's opinion this is, taking all service conditions into consideration, the only practicable way of dealing with corrugations.

On the Leeds Tramways extensive use has been made during the past eight years of "Sandberg" silicon steel rails, and whilst rails of this quality are by no means immune from corrugations, the development is very slow, and so far only an inconsiderable amount have had to be removed by grinding. During the past year experiments were commenced in Leeds with "Sandberg" air-cooled silicon steel; this steel is of the same chemical composition as the ordinary "Sandberg" steel, but by means of a patented process of cooling through the critical range of temperatures at a predetermined rate, a sorbitic structure is formed. Considerable interest is being taken in this new treatment, which is applicable to both carbon and alloy steels, and in promising to present a paper on the subject at an early date to the Iron and Steel Institute, Dr. Stead, F.R.S., the eminent metallurgist, stated that rails which had been treated by Sandberg's new process had shown an increased life of from 100 to 150 per cent.

The following table gives full particulars of the Leeds test on air-cooled Sandberg steel :—

LEEDS CITY TRAMWAYS

Test No. 1. Boar Lane, Leeds. *Ordinary Sandberg Silicon Steel.*
Test No. 2. Ditto *Sandberg Air-cooled Silicon Steel.*

	(1) ORDINARY "SANDBERG."	(2) "SANDBERG" AIR-COOLED.
Location (outgoing track)	Boar Lane, nr. Mill Hill	Boar Lane, between Mill Hill and Alfred Street
Alignment	490 ft. radius ...	245 ft. radius and straight
Gradient	1 in 116 (up) ...	1 in 116 (up) and 1 in 350 (down)
Speed	12 miles per hour ...	12 miles per hour
Weight	11 tons (4 wheels, 2 motors), wheels 30 in. dia.	11 tons (4 wheels, 2 motors), wheels 30 in. dia.
Period of test ...	12 months. Cars carried 533,333	12 months. Cars carried 533,333
Length of test rail ...	40 yards of rail ...	120 yards of rail
Composition ...	Carbon ·52%, silicon ·315%, manganese 1·12%, phosphorus ·07%. Basic Bessemer process	Carbon ·51%, silicon ·316%, manganese 1·14%, phosphorus ·07%. Basic Bessemer process
Tensile test	54·8 tons per square inch. Elongation 15%	58·2 tons per square inch. Elongation 13%
Impact test ... Supports 3 ft. 6 in. apart, 12 ft. drop. Weight of tup 2,240 lbs.	1⅜ in. deflection ...	1⅜ in. deflection
Crushing test ... 50 tons pressure. Diameter of ball 19 mm.	3 mm. impression ...	2·7 mm. impression
Bending test	Rail curved to 20 ft. radius. No sign of fracture	Rail curved to 20 ft. radius. No sign of fracture
AVERAGE DEPTH OF WEAR	·1406 in. = 24·99% of available depth	·0468 in. = 8·32%
MAXIMUM DEPTH OF WEAR	·1562 in. = 27·76% ...	·0625 in. = 11·11%
MINIMUM DEPTH OF WEAR	·1250 in. = 22·22% ...	·0312 in. = 5·54%

NOTE.—The average depth of wear on the "air-cooled" steel, as shown above, is only 8·32% of the total available depth of metal, while the average depth of wear on the ordinary quality is 24·90%, indicating an increased durability of over 200% in favour of the "air-cooled" quality, for the period mentioned above (12 months). So far there are no indications of corrugation.

It is too early to draw definite conclusions from this experiment, but from the data obtained from rails of this quality after twelve months in service, on the most heavily "trafficked" route in Leeds, it is evident that a rail steel with markedly superior wearing properties has been obtained by this improved process of manufacture, and as experiments are being made on other tramways with this steel its subsequent behaviour over a more extended period will be watched with considerable interest.

OVERHEAD TROLLEY RISKS.

Apropos of an article on the above subject in our issue of July 15, it is interesting to record that a London manager has taken steps to guard against accidents from trolley arms and wires on cars not fitted with top covers. On a car belonging to the South Metropolitan Tramways and Lighting Company, Limited, there is to be seen near each canopy an arched overhead rail, as shown in the appended photograph. This device, which is earthed, is likely to afford protection to top deck passengers in the event of the trolley arm or the wire falling. Its efficacy has been proved in

Protection from the Trolley Arm.

cases in which the boom is carelessly turned by conductors, when passengers' hats would be struck but for the presence of the hoops. Each hoop also serves to suspend a lamp to light the staircase. On no undertaking around London does it appear to have been found desirable to adopt a loop of material more substantial than rope for the secondary connection between the trolley wheel and the arm. In one case, however, there is a double thickness, bound together at its extremities. The objection to any stronger material seems to be the risk of bringing down the trolley wire in the event of the arm becoming displaced and colliding with the overhead equipment.

Subsidy for an Anglo-Italian Company. It was stated in the House of Commons, on July 31, that the Government had arranged to give an annual subsidy up to £50,000 for ten years to the newly formed British-Italian Corporation, Limited. The company's capital of £1,000,000 has been subscribed mainly by the banks, and the objects will be to promote trade and to enable Italy to look to London for financing instead of to Berlin.

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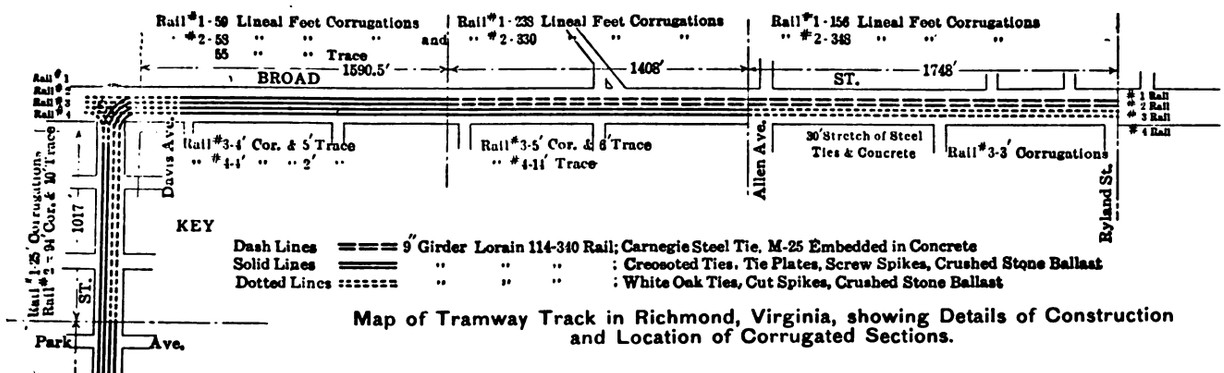
RESILIENT TRACK AND RAIL CORRUGATION.

The contention has often been advanced that the rigid tramway track construction with which we are familiar in this country is a contributing cause to rail corrugation. On the other hand, there are many well-known cases of corrugation on railways where sleeper and ballast construction is used. There is, however, a large body of opinion that other things being equal there is less likelihood of corrugation where the track has a certain resiliency, as with rails laid on sleepers, than when the track is rigid, as is the case where the rails are laid on a concrete foundation. It will be interesting to hear what is the experience in this country in connection with certain lengths of tramway track which have been laid on sleepers.


Rail #1-59 Lineal Feet Corrugations
#2-53 " " " and
55 " " Trace
Rail #1-238 Lineal Feet Corrugations
" #2-330 " "
Rail #1-156 Lineal Feet Corrugations
" #2-348 " " "
BROAD
1590.5'
1408'
ST.
1748'
Davis Ave.
Rail #3-4' Cor. & 5' Trace
" #4-4' " " 2' "
Rail #3-5' Cor. & 6' Trace
" #4-11' Trace
Allen Ave.
30' Stretch of Steel Ties & Concrete
Rail #3-3' Corrugations
Ryland St.
1 Rail
2 Rail
3 Rail
4 Rail
KEY
Dash Lines 9" Girder Lorain 114-340 Rail; Carnegie Steel Tie, M-25 Embedded in Concrete
Solid Lines " " " : Creosoted Ties, Tie Plates, Screw Spikes, Crushed Stone Ballast
Dotted Lines " " " : White Oak Ties, Cut Spikes, Crushed Stone Ballast
Park Ave.
ROBINSON
Main St.

Map of Tramway Track in Richmond, Virginia, showing Details of Construction and Location of Corrugated Sections.

Meanwhile we quote some American experience as given by Mr. T. Norman Jones, jun., chief engineer of the Virginia Railway and Power Company, Richmond, Virginia. Writing in the *Electric Railway Journal*, of New York, he says that his company has had some interesting experiences with rail corrugation which developed on two miles of track. After having carefully inspected various sections of girder rail tracks constructed on various types of foundation, Mr. Jones in the spring of 1912 came to the conclusion that track constructed on a resilient foundation was superior to track constructed on a rigid foundation, and that the use of the former would greatly retard the developmen of corrugations. Having succeeded in convincing the street committee of the City Council that a change from concrete foundation to crushed stone would be desirable from the city's standpoint as well as that of the company, the management was permitted to adopt a resilient type of construction. During the summer and autumn of 1912 a considerable amount of track was constructed on crushed stone foundation, which type has been standard with the company ever since. The arrangement provides for crushed stone under and partly between the ties or sleepers, with a slab of concrete partly between and on top of the ties to support the paving.

Confirmation of Mr. Jones' belief is found in the data given in the accompanying illustration, which shows the tracks on Broad Street from Ryland to Robinson Street and on Robinson Street from Broad to Main Street, Richmond. The most interesting comparison is to be found in the section of track between Ryland Street and Allen Avenue. During 1908 or 1909 a 6 in. concrete foundation was placed under the westbound track from Ryland Street to Allen Avenue. It became necessary to renew the rails and reconstruct both tracks in 1912. In the reconstruction of the westbound track between Ryland Street and Allen Avenue the concrete foundation referred to above was utilised as the concrete was of good quality and the whole base in excellent condition. In the existing concrete foundation trenches were cut crosswise of the track at 8 ft. intervals. In these excavations Carnegie steel ties were placed and bolted to the rails, and fresh concrete was placed around and under the Carnegie ties to secure them in place.

In the construction of the eastbound tracks between the points above-mentioned, the foundation was thoroughly rolled before the placing of crushed stone ballast, after which the ties and rail were placed. For a portion of the distance, as noted in the illustration, white oak ties were used, the rails being fastened to them with cut spikes. In the remainder of this section creosoted pine ties were used with tie-plates and screw spikes.

Over both sections of track cars of the same type have been operated; in other words, the same cars that operate over the westbound track return over the eastbound track. Some of these cars were equipped with cast-iron wheels, others with steel wheels.

From the details given it will be seen that in both rails of the track on concrete, or rigid, construction there is a total of 1,072 feet of rail affected by corrugation, whereas in the same length of track constructed on a crushed stone, or resilient, foundation, only 8 ft. of corrugation is to be found. Only rail on which the wave length of the corrugation could be accurately measured was noted.

CHICAGO ELEVATED RAILROAD'S SAFETY RECORD.

The Chicago Elevated Railroads have recently called the attention of the public to their unparalleled record of operation. This road has carried 1,200,000,000 passengers during the past eight years without a single fatal accident to a passenger on a train. Every weekday the elevated system carries upward of 500,000 passengers, and this record of safe operation is a source of gratification to the management and to the employees, who look upon it as an incentive to try, with the co-operation of the public, to eliminate all minor accidents.

Regarding this notable record, the Chicago *Herald* recently remarked that " the managers and employees of the Chicago Elevated Railroads are certainly entitled not only to feel some pride but also to advertise the pride they feel in the results of their efforts to carry safely all who use these transportation facilities."

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LONDON, AUGUST 10, 1916.

London Tramway Finance.

It was, of course, anticipated that the working of the London County Council tramway undertaking for the past financial year would, after meeting capital charges, result in a considerable loss. The expectation has been fulfilled, but the deficit is not so great as might have been feared. The reserve funds are so depleted that the future cannot be faced without some anxiety. To the ordinary ratepayer, knowing only that the undertaking is by far the biggest tramway system in the kingdom, and that there are many smaller but highly successful municipal tramways, it might at first seem strange that it should be in any financial difficulties. There are, however, various special circumstances. The capitalisation per mile of route is exceptionally high, making the interest and sinking fund charges extremely heavy. That trouble will be gradually diminished as time goes on by the application of the sinking fund. The conditions of the past year have been exceptionally unfavourable. The great tramway strike occurred in the period under review, and it is said to have cost £100,000. The coal bill was higher by nearly the same amount than it would have been at pre-war prices. Allowances to dependents of men who have joined the colours absorb a large sum. A survey of recent years shows, however, that whatever the circumstances the undertaking has not been prosperous financially. A permanent cure is needed for what threatens otherwise to be a permanent evil. There can be no doubt that to earn the heavy capital charges and to leave an adequate margin for renewal and reserve funds, the fares are much too low. Not only are there halfpenny fares, but the halfpenny fare stages are very long. Some neighbouring systems working on a smaller scale have recently abolished halfpenny fares, and the obvious course for the County Council is to take its courage in hand and make the minimum fare a penny. In the year 1914-15 about 29 per cent. of the total number of passengers paid halfpenny fares, and 41 per cent. contributed a penny per head. No doubt the abolition of the halfpenny fare would reduce the number of short-distance passengers, but the increase of the minimum to a penny would more than compensate for that. Another apparently necessary step is to increase workmen's fares, on which the estimate of a loss of about £80,000 a year apparently still holds good. Workmen can travel six miles or more for a penny. The charge should be graded according to distance, with a minimum of a penny. Cheap workmen's fares are a serious burden on many tramway and railway systems. They are, after all, a subsidy to employers, and it ought to be possible at least to reduce the loss arising from them. Whether the County Council decide on raising fares or not, it is certain that some drastic action is necessary, and if the ratepayers' pockets are to be spared it should be taken without delay. There can be no excuse whatever for conducting the tramway system of the greatest city in the world at a loss. It should at least be self-supporting, and those who maintain that ratepayers are entitled to a small profit for the use of their credit on which were obtained the huge loans required for the construction of the conduit system cannot be said to make an unreasonable claim.

Tramway Services after Two Years of War.

From various quarters we hear of complaints being made that the efficiency of tramway service has declined, that cars are not so clean or so well maintained, that the speed is slower, that the

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permanent way is falling into general disrepair, that the consumption of power is rising in comparison with mileage, and that everything connected with tramway business is not what it was before the war. Broadly regarded, these complaints have only slight foundation ; in any case, they are inconsiderate in the extreme. Tramway staffs have been denuded of their best men for military service ; the most experienced and most active of our motormen and conductors are in the far-flung battle line ; the most skilful of our electricians and fitters have been called into Government service ; while the munitions factories have drawn men from tramway undertakings to such an extent that only those who are absolutely necessary for the carrying on of the work remain. The conductors and motormen who have been left are often overworked, and the newer hands are either youths or old men, and in many cases women. The handling of an electric car demands a certain minimum of careful skill, a sense of responsibility, and a clear understanding of the mechanism of the car. Those essential qualities are not acquired in a day by even the most capable men. We would not disparage by a single word the service which the men at present on the cars are giving, but no man works in a temporary job with the same efficiency as he does when engaged in his ordinary work. For one thing, the men know that they are indispensable, and the knowledge that they cannot be conviently dismissed does not make workmen the more amenable to discipline. As regards the conditions in the workshops and depots, tramway managers and engineers are entitled to the fullest sympathy in their difficult and trying task. On the whole, it must be admitted that those in charge of tramway undertakings have taken the wise and patriotic view of their duty. In the first instance, they encouraged their best men to offer their services to the nation ; and they set themselves to getting the work done, and continuing on as best they could under conditions of extreme difficulty. Under the stress of these conditions, meticulous attention to the perfection of small details became impossible and undesirable. The one object has been to carry on, and in general this has been done with surprising success. With regard to the increased power consumption, it is admitted that the utmost economy should be practised, but consideration should be given to the fact that much of the labour available for the power station and the driver's work is lacking in the skill and experience necessary. In a word, the users of tramcars and the tramway authorities must be constantly reminded that the nation is at war for its life, that the best energy of the tramway business, in common with that of almost every other peaceful pursuit, has been turned into war uses, and the public should be well content with such services as managers deem practicable and in the best interests of all concerned. This subject was discussed many months ago in these columns ; but it is desirable that after two years of war, attention should again be directed to the difficulties which confront those who are responsible for tramway services. They have no desire to subject the public to any more inconvenience than is necessary ; but it should be realised that it is in the interests of the nation that business of every kind should be considered as subordinate to the necessity of carrying the war to a successful end.

Differential Gears and Corrugation.

Results that have recently been obtained from the use of differential gears on some of the Huddersfield Corporation tramway cars were given in a recent issue by the general manager and engineer, Mr. Wilkinson, who has devoted a great deal of attention to the experiments. Differential gears are, of course, universally employed on automobile road vehicles, and years before there were any vehicles of the kind in use such gears were employed on tricycles. The tramcar is not called upon to make such acute curves as rail-free vehicles habitually perform, and though tramway curves are much sharper than those on railways, the railway form of wheels and axle has been retained for tramways. The wheels being rigidly attached to the axle, and revolving with it, the general belief is that much wear and tear of tires are caused in rounding curves. The outer and the inner wheels having different distances to travel, and yet having to revolve at the same rate, slipping and skidding must be looked for. But Mr. Wilkinson reports what must be regarded as the strange fact that with the differential-geared cars there has been no reduction in tire

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wear or current consumption. Yet if the gear is working properly there should be no slipping or skidding on curves, as each wheel is free to revolve independently. Is the inference to be drawn that tire wear caused by curves has been much exaggerated? The special gears have been in use in Huddersfield since October, 1914, so that any difference in wear should be noticeable. It is gratifying, however, to know that the purpose for which the gears were introduced has, up till now at any rate, been attained—namely, the stoppage of rail corrugation. If the tires have not been saved, the rails have so far shown none of that kind of wear which takes the form of corrugation.

MUNICIPAL TRAMWAYS ASSOCIATION.

ANNUAL CONFERENCE.

The annual conference of the Municipal Tramways Association (Incorporated) will be held, as announced in our issue of July 15, at the Surveyors' Institute, Great George Street, London, S.W., on Thursday and Friday, September 21 and 22. The programme is as follows:—

THURSDAY, SEPTEMBER 21.

10.45 a.m.—Meeting of the Executive Council.
11. 0 a.m.—Presidential address by Mr. P. Fisher, general manager of Dundee Corporation Tramways.
Paper—"Some Notes on Passenger Transportation in Large Cities," by Mr. J. M. McElroy, general manager, Manchester Corporation Tramways.
1. 0 p.m.—Interval.
2. 0 p.m.—Paper—"Utilisation of Tramways for Goods Traffic," by Messrs. G. W. Holford, general manager, Salford Corporation Tramways, and W. Clough, general manager, Bury Corporation Tramways.

FRIDAY, SEPTEMBER 22.

10.30 a.m.—Meeting of the Executive Council.
10.45 a.m.—Meeting of Managers' Section.
11. 0 a.m.—Annual General Meeting.

As was the case last year, no social functions will take place in connection with the conference, and the usual Association dinner will be omitted. St. Ermin's Hotel, Westminster, S.W., has been selected as headquarters.

Communications should be addressed to the Hon. Secretary, Municipal Tramways Association, 7, Hall Ings, Bradford (Telegrams: "Tramways, Bradford").

PASSENGERS' LIABILITIES.

Notices were recently posted in the Newcastle cars warning passengers that they are responsible for paying the fare, and that the penalty for non-payment is 40s. The notice is, we believe, based upon the following clause from the Tramways Act, 1870:—

> "If any person travelling or having travelled in any carriage on any tramway avoids or attempts to avoid payment of his fare, or if any person having paid his fare for a certain distance knowingly and wilfully proceeds in any such carriage beyond such distance and does not pay the additional fare for the additional distance, or attempts to avoid payment thereof, or if any person knowingly and wilfully refuses or neglects on arriving at the point to which he has paid his fare to quit such carriage, every such person shall for every such offence be liable to a penalty not exceeding 40s."

Overcrowding is being dealt with under the following regulation commonly found in tramways bye-laws:—

> "No person shall hold or hang on by or to any part of any car, or travel therein or thereon, otherwise than on a seat provided for passengers, except in the interior of the car with the consent of the conductor."

Several persons have lately been fined by the Birmingham magistrates for having removed the chain placed across the entrance to tramcars to prevent persons from entering, and having boarded the vehicles.

TRADE AFTER THE WAR.

THE PRIME MINISTER CHAMPIONS A NEW POLICY.

NEED FOR PROMPT ACTION.

At last important action on the part of the Government has begun with the object of securing and improving the industrial and commercial position of this country after the war. The Government fully realise, and apparently the great majority of the members of the House of Commons realise the urgent necessity of effective steps being taken to checkmate all the machinations which Germany will let loose as soon as peace is declared. The statement made by the Prime Minister in the House of Commons on August 2 on the resolutions passed by the Allies' Economic Conference in Paris is thoroughly satisfactory as far as it goes. But at present it does not go far enough. The Government have already taken some steps towards carrying out certain of the resolutions, but they have put forward no scheme for giving effect to the most important. It is perhaps too soon to look for a complete scheme, but no opportunity should be lost of urging the need for prompt action. Meanwhile we consider that the great point has already been achieved, namely, that the Government will not be hidebound by antiquated fiscal theories, but will adopt whatever appear the best means to prevent German dumping and commercial penetration, and to foster and encourage British industry.

Mr. Asquith's speech consisted in large part of a citation of the leading resolutions of the conference, of a statement of approval of them, and of indications of what the Government are doing in the matter. The securing of economic independence for the allied countries he took as the keynote of the whole scheme. The first practical step of the Government, which is now being carried out, is the extension of the "black list," so as to prohibit trade during the war with enemy subjects wherever resident. Then the Prime Minister expressed strong adherence to the resolution against granting most-favoured-nation treatment to enemy Powers. Another encouraging point was that no legislation will be required to carry out the resolution to conserve for the allied countries their natural resources during the period of reconstruction and to facilitate the interchange of these resources. The case of each commodity is to be separately considered, and a check will thus be placed upon German efforts to obtain control of supplies in the countries of the Allies.

No indication was given by the Prime Minister as to what steps the Government propose to take to prevent German dumping fo a period of years, though he fully endorsed the resolution on the subject; but according to that resolution the matter is to be settled by agreement through diplomatic channels between the Allies. There seems to be no doubt, however, that if the Government propose tariffs for the purpose legislation will be required.

Nor was Mr. Asquith more specific as to how the Government propose to carry out the great resolution under the head of permanent measures, viz., that which declares that steps are to be taken without delay to render the Allies independent of enemy countries. Each Ally is left free as to the means "having regard to the principles which govern their economic policy." The resolution suggested subsidies, grants of financial assistance, and Customs duties or prohibitions. The Prime Minister indicated that something was already being done to encourage British industries, and spoke in glowing terms of their

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enterprise and development since the war began. In certain trades changes have already taken place amounting to a positive revolution. The Government are considering, in concert with the representatives of labour, the outlines of a post-war policy, social and industrial.

The Board of Trade, Mr. Asquith assured the House, are actively engaged in devising schemes to render us independent of enemy supplies as regards various important commodities. A State scheme of assistance for scientific and industrial research has already been created. The question of industrial policy generally has been referred to a strong committee of which Lord Balfour of Burleigh is chairman, than whom a more admirable man for the duty could not be desired. The Government are communicating with the Dominions and India, and when Lord Balfour's Committee reports the Government will hold an Imperial Conference to consider Empire trade policy in the light of the resolutions. As to the old doctrines of free trade, the Prime Minister confessed that the upheaval caused by the war must suggest new problems or some modifications of the solution of old ones. This is a significant and encouraging admission coming from a Minister who, standing in the same place, once celebrated the "obsequies of preference." But for other lifelong free traders, as well as for Mr. Asquith, the logic of events is effecting a conversion which, if belated, is likely to be thorough and lasting.

Apparently no decision will be reached on the question of permanent tariffs against the enemy Powers until the promised Imperial Conference is held. Nor in the circumstances could it be. The Dominions are our partners, and they already have tariffs. It is, however, of great importance that the work of Lord Balfour's and other committees should be expedited, and that the new conference should be held as soon as possible. In the debate which followed Mr. Asquith's statement Sir Edward Carson approved warmly of the whole programme, but called on the Government to produce their scheme. Mr. Bonar Law, speaking later for the Government, emphasised the importance of organisation; he regarded that as even more important than tariffs. During the discussion only two or three voices crying in the wilderness protested against the resolutions. They included those of Sir John Simon, a visionary who left the Government because he failed to understand the demands of an unprecedented war, and Mr. Snowden, a Labour-Socialist. Two recognised leaders of the Labour party, Mr. Wardle and Mr. Hodge, supported the resolutions, and so did several other members. The debate took place on a motion for the adjournment of the House, so that no resolution on the subject was submitted.

The need for prompt action by the Government was reiterated by Mr. Hughes, Prime Minister of Australia, in an interview published on August 3, the same day as that on which the report of the debate in Parliament saw the light. Mr. Hughes has returned to Australia. He said that the potential effects of the resolutions of the Economic Conference were almost infinite. Then he added:—

> We must start immediately to give effect to those resolutions. Not to act promptly is as fatal as not to act at all. The resolutions will be merely empty words unless Great Britain takes the lead. The Allies expect her to breathe into the dry bones of their agreements the breath of life.

These are stirring words. If this country had in its Government some of the driving force which resides in Mr. Hughes many things would be altered for the better.

It may be noted that besides Lord Balfour's committee to which Mr. Asquith referred, one of the committees recently appointed by the Board of Trade, and presided over by Lord Farringdon, is instructed to consider the best means of meeting the needs of British firms after the war as regards financial facilities for trade, particularly with reference to the financing of large overseas contracts, and to prepare a detailed scheme for that purpose. That ought to mean action of great and practical importance.

To complete the outline, the reference to Lord Balfour's committee (which was appointed by the Prime Minister) is that it is to consider the commercial and industrial policy to be adopted after the war, with special reference to the conclusions reached at the Economic Conference of the Allies as to the following questions:—

(*a*) What industries are essential to the future safety of the nation and what steps should be taken to maintain or establish them?

(*b*) What steps should be taken to recover home and foreign trade lost during the war, and to secure new markets?

(*c*) To what extent and by what means the resources of the Empire should and can be developed?

(*d*) To what extent and by what means the sources of supply within the Empire can be prevented from falling under foreign control?

It is important to note that the members of the committee include the chairmen of various other committees which have been constituted for the purpose of anticipating the position of particular industries after the war.

It is gratifying to learn that the United British Industries Association has now been fully constituted, more than the 100 firms originally called for having come forward, each depositing a £1,000 guarantee. This powerful body ought to have great influence in fostering industry.

MANCHESTER TRAFFIC PROBLEM.

The Work of the Congestion Committee.

The Treasury having vetoed during the war any expensive street improvement for the purpose of dealing with traffic congestion in the central area of Manchester, no attempt has been made to carry out a scheme based upon the report presented by Mr. J. M. McElroy as the result of his visit to America and the Continent in 1913. That report was very fully noticed in the Tramway and Railway World of April 9, 1914. Discussion of the question is, however, being maintained by a Special Committee, who have been considering the reports issued by the Tramways Committee, the Watch Committee, and the Improvements Committee. The committee is known as the Traffic Congestion Committee, and although their sittings are private, statements are issued from time to time concerning their proceedings. They have appointed a sub-committee composed of the chairmen and deputy chairmen of the Traffic Congestion, Watch, Tramways, Improvements, and the Old Infirmary Site Committees. The object of the sub-committee will be to prepare a report for presentation to the City Corporation. A member of the sub-committee has stated that they hope to present a "much more workable and less costly scheme" than those put forward in the reports of the first three of the foregoing committees. He added that it is not expected that the problem can be effectively dealt with under an expenditure of about one million sterling.

So far consideration has been given to the reports of the Tramways and Watch Committees, to various suggestions emanating from members, and to the report of the Improvements Committee upon the schemes proposed by the Tramways and Watch Committees. In that report the Improvements Committee point out if the scheme advised by the Tramways Committee alone were adopted the cost would be not

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far short of three million pounds. While approving of a number of the proposals of the Tramways Committee, notably the new tramway routes and terminals in widened thoroughfares, they suggested that several of the alterations might be effected at much less cost. The objection of expense was also raised by the Improvements Committee in reference to the Watch Committee's recommendations, which included subways, bridges, and inclined approaches. The first two proposals they considered would be of little use, and the latter they seem to have condemned as being impracticable.

Another project to which some discussion has been devoted is an extension of the motor omnibus department of the tramways undertaking. The proposer suggested that omnibuses might be used to take passengers to special terminals beyond the crowded streets in the centre of the city. The idea apparently is to cease running the tramcars in Market Street, Corporation Street, Cross Street, and Oldham Street. Nearly three thousand cars pass daily up and down Market Street. It is not explained how congestion is to be lessened by filling the streets with the larger number of omnibuses that would be required to deal with the traffic now carried by the cars. No surprise will therefore be created by the latest announcement that this idea has not gained serious attention.

It may be of some interest to the committee to learn that a stranger visiting the city, after reading what has been written anent the traffic problem, is at a loss to discover indications of serious congestion. Much of the congestion is apparently due to the great extent to which horse traction is still employed and to obstruction created by vans at warehouses and factories. From time to time the Watch Committee have proposed that the Corporation should secure powers to deal more effectively with the latter item, but the opposition has proved too strong for them. Considerable advantage would arise if the Corporation possessed powers to order certain streets to be reserved for one-way traffic, such as is the case in the City of London, and also to divert slow traffic to parallel thoroughfares.

ANNUAL STATEMENT OF TRADE.

Certain alterations in classification, recommended by the British Electrical and Allied Manufacturers' Association to the Board of Trade in 1914, will appear in the issue of the annual statement of trade of the United Kingdom covering 1915, which, it is anticipated, will be shortly issued. The new classification will be as follows :—

IMPORT LIST.

Electrical Goods and Apparatus, etc.—Meters and measuring instruments, switchboards, and unenumerated.

Machinery and Parts thereof (Electrical).—Generators and motors (except for aeroplanes, motor cars, and motor cycles) and unenumerated.

EXPORT LIST.

Electrical Goods and Apparatus, etc.—Meters and measuring instruments, transformers, switchboards, and unenumerated.

Machinery and Parts thereof.—Prime movers (except electrical). Other kinds :—Steam reciprocating engines, steam turbine engines, internal combustion engines (except for aeroplanes, motor cars, and motor cycles), and unenumerated. Electrical :—Railway and tramway motors, other generators and motors (except for aeroplanes, motor cars, and motor cycles), and unenumerated.

A Harvest Poster.—The new 60 in. by 40 in. "Harvest" poster, the work of Mr. J. Walter West, now being shown on the Underground railway stations, is of topical interest in view of its bearing upon the food supply of the nation. Although the exhibition of new pictorial advertising has ceased for the time being on the Underground railways, the "Harvest" poster has been issued as arrangements had been made for its production, and it is felt that its publication would be a reminder to the public to see for themselves the growing fields of ripening corn which exist but a few miles from the metropolis. It also illustrates another modern change—the employment of women on the land. It chronicles pictorially a new era and the revival in agricultural life.

INCREASED FARES.

THE HALFPENNY RIDE UNREMUNERATIVE.—RESULTS OF THE INCREASES AT BIRMINGHAM AND LEICESTER.

It will be a convenience to our readers to have a list of the tramway undertakings that have increased their fares in order to meet the extra cost of working and maintenance brought about by the war. The appended list is compiled in the order in which the various authorities took action.

BIRMINGHAM.

On June 1, 1915, the Tramways Committee submitted to Birmingham Corporation a report recommending that 1½d. stages be increased to 2d., the 2d. stages to 2½d., and the curtailing of the length of the first penny stage from the centre of the city from an average of 2¼ miles to an average of 1¾ miles. It was also advised that the workmen's 1d. return tickets should be abandoned. Councillor Harrison Barrow, chairman of the committee, justified the recommendation on the grounds of the higher cost of materials, labour, rates, and income tax, while war allowances to dependants were expected to go up by £17,000 to £35,000 If the existing fares were maintained, he said that the estimated surplus would not exceed £4,000, which would be £30,000 short of the amount required for the reserve fund, besides leaving nothing to be voted in relief of rates. The latter item in the three preceding years had totalled £30,130 in 1914–15, £45,168 in 1913–14, and £62,248 in 1912–13. By a large majority the Council adopted the recommendation.

As an indication of the result we may make a quotation from the paper in which Mr. Alfred Baker, the general manager, ably dealt with the matter, entitled "Financial Problems as affecting Tramways during War Time," at last year's conference of the Municipal Tramways Association. At that time the new fares had been in operation not far short of two months. Mr. Baker said there was no grumbling on the part of the passengers, who recognised that fares, like everything else, must go up. The receipts for August, the first month of the new fares, showed an increase of 1·49d. per car mile, viz., from 11·69d. in June, 1915, to 13·18d. The increase was equal to £1,666 per week, and Mr. Baker estimated that at the end of the year the receipts would be augmented by a sum of £70,000 or £80,000.

By turning to the annual report for the year ended March 31, 1916, published in our issue of July 13, the full extent of the financial result will be seen. Receipts showed an increase of £124,945, or 19·5 per cent. in excess of the previous highest total, which was recorded in the preceding year. Expenditure exceeded the previous year's figures by £60,000, or 12·7 per cent. It should be noted that, mainly owing to the great activity created in the city by war work, the number of passengers increased by nearly 14 millions, as against an increase of nearly three millions for the preceding year. The average fare paid per passenger rose from 1·03d. in the two previous years to 1·12d. After paying interest and sinking fund charges, the surplus available for the reserve fund and relief of the rates was £107,749.

BLACKPOOL.

The unprofitable nature of the contract tickets, 1,466 in number, was commented upon by Mr. C. Furness, general manager, Blackpool Corporation Tramways, in his report for the year ended March 31, 1915. Mr. Furness submitted figures showing that these season tickets holder were subsidised to the extent of one farthing per journey. In October, 1915, the Council agreed to raise the charge from £3 to £4.

LEICESTER.

On July 27, 1915, the Corporation of Leicester decided, on the recommendation of the Tramways Committee, to raise the charge of 1d. for early morning return tickets, transfer, and over-lapping tickets to 1½d., and that the fares on Stoneygate, Aylestone, and Clarendon Park sections be increased to 1½d. for the full journey, with a penny stage for two-thirds of the distance. Alderman Flint, chairman of the Committee, stated that the increased cost of working entailed by the war made it necessary to find another £19,000 of income. It was estimated that the higher fares would bring in £16,000. On May 7 the sale of books of tickets which were issued at a discount was abolished for the period of the war.

In his report on the working of the tramways for the year ended December 31 last, Mr. A. F. Lucas, general manager, attributed the increase of £10,014 in the passenger receipts to the exceptionally good trade and to the increased fares. There was an increase of 2,525,385 in the number of passengers, and a decrease of 237,323 in the car mileage. Working expenses rose by £3,535.

GREAT YARMOUTH.

In July, 1915, the Council adopted a recommendation made by the Tramways Committee, on the advice of Mr. F. L. Turner, the general manager, to fix the penny stage on the Gorleston section at the Halfway House instead of the Barking Fishery premises. The latter stage had proved unprofitable since it was instituted "to make the cars popular."

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BELFAST.

In August, 1915, a fare of 2d. charged for the Glengormley six-mile pleasure ride on the Belfast Corporation Tramways was increased to 3d., and the committee were instructed to revise the working expenses so as to meet the deficit of £5,400 anticipated by the city treasurer.

EDINBURGH.

In November last the Edinburgh Tramways Company raised the ordinary and workmen's fares. In many cases a halfpenny was added to the penny stages. A deputation of the directors informed the Tramways Committee that the total advance in the costs of cables, coal, etc., was about £25,000, and in addition the company were paying war allowances to employees' dependants. The increased fares, they added, would amount to 8 per cent. on a turnover of £310,000 per annum, and would affect about one-fifth of the passengers.

DOUGLAS.

The up-journey fare on the cable section of Douglas Corporation Tramways was increased on December 20, 1915, from 1d. to 2d. On the horse section the charge was raised to 2d. either way.

DEWSBURY AND BATLEY.

The Yorkshire (Woollen District) Electric Tramways Company altered the fare from Dewsbury to Hick Lane, Batley, from 1d. to 1½d.

NEWCASTLE-ON-TYNE.

Finding it impossible to cope with the workmen's short distance traffic at halfpenny fares, Newcastle Tramways Committee on May 27, 1915, abolished the halfpenny charge and made a penny the minimum fare.

On May 3, 1916, the City Council confirmed a proposal by the committee to put an end to workmen travelling at half fare, which resulted in a loss of 2·158d. per car mile. The following regulation was agreed to :—" That no reduced fares be allowed except to those passengers producing coupon tickets, and that 12 coupon tickets entitling a passenger to travel a 1d. workmen's distance shall be sold at 1s. 3d. instead of 1s. ; similarly that 12 coupon tickets for a 1½d. workman's distance shall be sold at 1s. 9d instead of 1s. 6d. ; and that 12 dinner-time coupons for a ½d. workman's distance shall be sold at 8d. instead of 6d." It is hoped by this means to increase the revenue by £10,000 per annum. The increases came into effect on May 21.

At the end of June, the fares on the Corporation omnibuses were advanced in amounts ranging from a ½d. to 1d., in order to meet the increased cost of petrol. The effect of the increased fares may be gathered from the return for the four weeks ended July 15. For the first week the receipts totalled £6,824, and for the fourth week £7,129, while the average number of cars in use had risen from 157 to 159. For the four weeks the receipts were £27,698, as against £26,006 in the corresponding period of last year, while the average number of cars in use had gone up from 128 to 159. The comparative return from April 1 to July 15 (106 days) showed receipts amounting to £98,221, as against £94,821 for the corresponding period of last year, an increase of £3,400. The number of passengers showed an increase of 879,372, and the number of miles run an increase of 104,915.

CROYDON.

To allow of increases being made in the employees' wages, Croydon Tramways Committee, in July of this year, recommended the Corporation to revise the fare stages by shortening. This would reduce the 1d. distances from an average of 2 miles 290 yards to 1 mile 1,416 yards, and the others accordingly. Ninety per cent. of the passengers pay penny fares, and the Committee are of opinion that the alterations would give an increase of 8 per cent. in the revenue, producing £7,472, which it is hoped would meet the extra sum of £1,865 required for wages, as well as the increased cost of materials, at the same time leaving a balance to place to the reserve and renewals fund.

Some objection was made to the revision of one stage at the Corporation's meeting on July 24, when it was stated that while two 1d. stages, 2 miles 1,280 yards and 2 miles 1,140 yards, were being increased to 1½d., a fare of 2d. was to be charged for the stage of 2 miles 1,180 yards from Thornton Heath to the Greyhound Hotel. A motion to refer back the latter revision was lost by four votes, and ultimately the report was adopted by a majority of 21.

KEIGHLEY.

The discontinuance of halfpenny fares was agreed to by Keighley Council in June, 1916. In their place prepaid tickets in books of 20 for 1s., 10 for 6d., and 5 for 3d. have been issued. When a prepaid ticket is not presented a uniform fare of 1d. is charged for any distance between two termini. The prepaid tickets are not available on Sundays or after 2 p.m. on Saturdays. Councillor A. Smith, chairman of the Tramways Committee, said the increased working costs entailed by the war had created a deficit during the past two years, and money was required to carry out necessary improvements.

KIRKCALDY.

To provide for future repairs and renewals, Kirkcaldy Tramways Committee have recommended the abolition of ½d. fares except on workmen's cars.

BLACKBURN.

An increase of fares is threatened at Blackburn. Councillor C. Higham, vice-chairman of the Tramways Committee, stated on July 8 that the expenditure had gone up by leaps and bounds, and £1,400 a year was being paid to employees' dependants. The receipts had declined, and the committee might have to consider the question of raising fares.

RAWTENSTALL AND BACUP.

Rawtenstall Corporation have asked Bacup Council to agree to increases of fares in the latter district. The Bacup authority have decided to consider modifications in the stages only, and have stated that Rawtenstall must ask the Board of Trade to appoint an arbitrator if their proposals are insisted upon. At a meeting of representatives of the two Councils in June, 1916, Alderman Coupe, chairman of Rawtenstall Tramways Committee, stated that the tramways, saddled by heavy charges due to the high purchase price of the old tramways, had involved the rates to the extent of 3½d. to 4d. in the £. The renewals fund was totally inadequate, and there was now the increased working charges due to the war. The alteration of fares was an adjustment of distances. At the present time the 1d. ride in Bacup was nearly half as far again as in Rawtenstall, where the full legal fare of one mile for a penny was being charged. The proposal was to divide the distance between Waterfoot and Bacup into five stages instead of four.

GLOUCESTER.

In July, 1916, there came into operation on Gloucester tramways a minimum fare of 1d., entitling the passenger to ride two stages of about half a mile each instead of three stages. The new arrangement does not apply to workmen and school children. For transfer tickets the charge has been increased from 1d. to 1½d. The Council's action was based on a report presented by Mr. F. H. Corson, the manager, in consequence of the higher cost of working. By the changes it is hoped to prevent further calls being made upon the ratepayers.

OUTER AREAS OF EAST LONDON.

After prolonged consideration, due mainly to the opposition of the labour members, West Ham Council in June last adopted a recommendation of long standing, made by Mr. J. S. D. Moffet, general manager, for the abolition of the ½d. fare, except for children, and the institution of a universal 1d. fare for any single journey on any car. Workmen's return fares were fixed at 1½d. The increased cost of working, and the prospect of the ratepayers being called upon to provide a large sum for renewals, are the causes that led to this effort to place the undertaking on a sound basis. The London County Council now have under consideration a letter from Mr. Moffet, asking them to withdraw the ½d. fare on the portion of the through running route in their area. Mr. Moffet added :—" If your Council are at all favourable to such an alteration, the opportunity presents itself for arriving at a uniform fare scheme for practically the whole of the tramways operating in the Eastern Metropolitan area."

Leyton Council have withdrawn the ½d. fare, which was adopted some years ago against the advice of a large body of expert opinion. On the recommendation of Mr. L. E. Harvey, the general manager, who has shown great zeal in the matter, the universal penny fare has been instituted.

On December 20, 1915, the Corporation of Walthamstow accepted a recommendation by the Tramways Committee for shortening all the stages, but Councillor W. R. Clarke, the chairman of the committee, urged that the halfpenny stages should be abolished and the present penny stages retained. During the ten years of the undertaking's existence the deficit has totalled £22,700, which the ratepayers have had to pay. In February, 1916, the Council adopted a new list of fares and stages recommended by Mr. W. Murray, the manager. Halfpenny fares were abolished except for children, and workmen's fares were increased by 50 per cent.

In consequence of another adverse balance (£4,869) on the East Ham tramways undertaking for 1914–15, Mr. Wm. Ullmann, the engineer and manager, was directed to submit a report on the question of a revision in fares and stages. The annual report gave the average fare charged per mile as ·63d. and the average ride given for ½d. as 1,457 yards, while the maximum was 1 mile 418 yards. In October, 1915, the Council adopted a scheme prepared by the manager for shortening the halfpenny stages.

NO LENGTHENING OF STAGES AT BRADFORD.

Bradford Tramways Committee in June last refrained from lengthening penny stages during the war, but instructed the general manager to bring up a scheme to adjust inequalities within three months after the declaration of peace. Mr. C. J. Spencer had reported that the cost of operation per car mile, including interest and sinking fund, for the past year amounted to 11·905d. Taking the last five years of peace, the receipts averaged 11·439d., which was ·466d. less than the expenses for the year 1915–16. If the receipts of war time had been the same per car mile as the average of the previous five years, there would have been a loss of nearly ½d. per car mile, so that if the receipts had not been in excess of the receipts in peace the undertaking would have shown a loss of £12,900.

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LONDON COUNTY COUNCIL TRAMWAYS.

At the meeting of the London County Council on July 18, the Highways Committee submitted the tramway accounts for the year ended March 31, 1916, together with the report of the chief officer of tramways on the working of the undertaking. The tramways extend over a total length of 150¼ street miles (144½ miles of electric lines and 5¾ miles of horse lines). The whole is worked by the Council with the exception of 2¾ miles in Harrow Road, which are worked by the Metropolitan Electric Tramways, Limited. The total income and working expenses were given in the following table, to which we have added the corresponding figures for the two previous years :—

	1915–16.	1914–15.	1913–14.
	£	£	£
Income	2,339,291	2,399,847	2,268,669
Working expenses	*1,683,660	†1,700,572	1,615,467
Surplus on working	655,631	699,275	653,202
Deductions—	£	£	£
Interest	326,477	330,300	—
Redemption	425,908	405,605	—
	752,385	735,905	736,598
Rent drawbacks, etc.	6,797	1	—
Income tax	40,000	32,102	28,197
Parliamentary expenses	2,261	2,803	2,086
	801,442	770,811	766,881
Less—Tax retained, interest on balances, rent, etc.	72,016	38,363	25,153
	£729,426	£732,448	£741,728
Deficiency (met from General reserve)	£73,795	£33,173	£88,526

* Including war service allowances of £95,365.
† „ „ „ „ £42,209.

The renewals fund amounted on March 31 to £329,968. There has been no payment into this fund since the year 1912–13. The general reserve fund on March 31, after meeting the deficiency on the year's working, amounted to £70,119. In the case of both funds the balances take no account of the depreciation of investments, which on present prices amounts to about 20 per cent. The total operating expenses, excluding war service allowances amounting to £95,364, were £1,588,295. The total number of passengers during the year was 545,423,397 ; the number of car miles was 47,879,675. The corresponding figures for 1914–15 were 550,497,993 and 58,978,792. In considering the results, the Highways Committee observe that it must be borne in mind that the strike, involving the disorganisation of the service and a consequent loss amounting to over £100,000, occurred in the second month of the financial year. Further, there is a special charge of £10,000 for the removal of the old horse lines in Liverpool Road. As the estimates for 1915–16 contemplated a deficit of £91,614, and this figure took no account of the loss of about £100,000 due to the strike, the actual results, which show a deficit of £73,795, are better than might have been expected. War conditions have seriously increased the working cost, but on the other hand some advantages have accrued through the relaxations of restrictions as to over-crowding. The capital expenditure up to March 31 amounted to £13,516,577, of which £200,854 represents the expenditure during the year 1915–16. The net debt on March 31 was £9,580,991, including £971,878 in respect of the horse tramways now obsolete. The sum paid as rates on the permanent way amounted to £82,927. This represents an average relief to the rates of London of about ½d. in the £. The savings of the road authorities in consequence of the Council maintaining the paving along the tramway routes is estimated at £140,000 a year. The expenditure incurred in the maintenance of the tracks during 1915–16 was ·52d. per car mile. The amount paid for street widenings and the estimated saving to local authorities on maintenance of paving gives a total of £238,469.

Finance Committee's Report.

The Finance Committee report that they approve the accounts of the tramway undertaking. These show that the net expenditure amounted to £200,854 and the total debt incurred up to March 31, 1916, was £13,930,660. The debt outstanding at the same date was £9,701,208. This debt included £971,878 in respect of capital expenditure on horse traction which had been rendered obsolete and has still to be provided for. The total revenue receipts for the year amounted to £2,339,291, a decrease of £60,555. The surplus on working was £655,631. The charges to be met are as follows :—Interest, £326,477 ; repayment of debt, £425,908 (less deductions amounting to £23,959), or a total of £729,426. These charges thus exceed the surplus on working by £73,795. This figure is, however, less than the original estimated deficiency for the year, which was £91,614. No payment has been made to the renewals fund in respect of the car mileage run, which was some years ago fixed at 1½d. per car mile. The expenditure for renewals of track and equipment amounted to £73,355, leaving a balance in the fund on March 31 of £329,968. This is invested in securities, and taken at current quotations these investments would stand at £274,654. The net deficiency for 1915–16 of £73,795 has been met by a transfer from the general reserve fund, which was reduced on March 31, to a balance of £70,119. Commenting on the position, the Finance Committee remarked that the condition of the undertaking causes them no little anxiety.

Annual Estimates, 1916–17.

The Highways Committee submitted the annual estimates for the year 1916–17, of which the following is a summary :—

Surplus on working		£655,355
Interest on bank balances and sundry rents ...		19,110
		£674,465
Deductions—		
Debt charges (repayment of capital, £429,851 ; interest, £313,273) ...	£743,124	
Income tax and sundry items ...	5,433	£748,557
Net estimated deficiency		£74,092

The reserve fund will be used to meet the estimated deficiency. The estimates contain provision of £20,000 for contingencies, and £122,500 for allowances to officers and employees on war service, but it is probable that this figure will prove insufficient, as the estimates were prepared before the introduction of the second Military Service Bill. But for these two special items of charge, the results of working the tramways for the year would show an estimated surplus of £68,408. The receipts are estimated at 11·50d. per car mile, as compared with 11·42d. earned in 1915–16. The estimates include no sum for addition to the renewals fund, and this fund and the general reserve fund will be more than absorbed if the estimated deficiency is realised. The Committee remark that they view with no little anxiety the probable continuation of the deficit, but they point out that in many directions the undertaking is being worked under abnormal and adverse conditions arising out of the war. In 1915–16 the electric car mileage was 47,867,176. The estimated mileage for the current year is 50,000,000

Sir John Benn contended there was no justification for predicting that the tramways would become a charge on the rates. The undertaking was handicapped by all sorts of charges.

Sir George Goldie (chairman of the Finance Committee) denied the suggestion that he or his committee were unfriendly to the tramways. His anxiety was to maintain their reputation, and he quoted from his budget statement the opinion that the tramways could not be judged by results obtained in war conditions and that their present position was not to be regarded as permanent. When the report was before the Highways Committee there was not a dissentient voice as to reporting the possibility that before long they would have to make a call on the rates. He pointed to the depletion of the renewals and reserve funds.

Mr. H. H. Gordon reminded the Council that in the last four years they had repaid two millions of debt on the tramways. This in the commercial world would be taken as equivalent to provision for depreciation. London would always require tramways ; the omnibuses could not carry the passengers. Cheap transit in London was a valuable asset and must be maintained, and he hoped that when the war was over the undertaking would be relieved of some of the burdens which ought never to have been placed upon it.

The reports were then received and estimates approved.

LONDON TRAMWAYS' RECORD REVENUE.

The traffic revenue on the London County Council's tramways for the week ended August 2 amounted to about £52,300, which is a record for the undertaking. For the two preceding weeks the totals were £49,514 and £48,584. The increase is mainly due to the presence of the captured German submarine mine layer off the Temple Pier. In the first seven days from July 26, 120,000 persons paid for admission to file past the vessel, the proceeds being given to naval charities. Many more were satisfied with a free view from a distance on the Victoria Embankment. The exhibition will remain open until August 15.

During one week's record traffic 729,177 children travelled by tramway at the reduced fare of half-price for those under 12 years of age for any single fare above a halfpenny. Many special cars were run for schools to the Embankment. The fares are largely taken advantage of by even the poorest children to visit the parks and open spaces.

Metropolitan Electric Tramways Bill.—This measure, which has received the Royal assent, relieves Middlesex County Council from any liability to proceed with the tramway and street widenings authorised by Parliament in 1911. An extension of time is allowed for the erection of railless trolley-car equipment in Wood Green and Tottenham.

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LONDON TRAFFIC REPORT.

Combined Railway, Tramway, and Omnibus Traffic.

The Annual Report of the London Traffic Branch of the Board of Trade was issued in April last, and was briefly noticed in these pages, but pressure on our space has hitherto prevented fuller publication of its contents. On local railways, tramways, and omnibuses the total approximate number of passengers in 1914 was 2,064,612,057, compared with 972,465,682 in 1903, and the number of journeys per head of population 276·5, compared with 144·9. For the purposes of the comparison the population of Greater London in 1914 is taken as 7,465,278, and in 1903 as 6,710,272. Passengers carried by local railways in 1903 numbered 290,722,680, and in 1914 the total was 462,019,537; by tramways (approximately), 394,356,531 and 846,000,673; and by omnibuses 287,386,471 and 756,591,847.

The following table, compiled from information obtained from the tramway authorities and railway and omnibus companies, gives approximately the number of passengers carried in the last twelve years by local railways, tramways, and omnibuses, and the report again draws attention to the importance of the roads in the consideration of the London traffic problem:—

Year.	Number of passengers carried by—				Estimated Population of Greater London.	Number of Journeys per Head.
	Railway (Local Companies).	Tramway (Approximate).	Omnibus.	Total (Approximate).		
1903 ...	290,722,680	394,356,531	287,386,471	972,465,682	6,710,272	144·9
1904 ...	298,638,750	431,813,839	288,965,214	1,019,417,803	6,775,645	150·5
1905 ...	305,052,495	477,944,684	290,665,051	1,073,662,230	6,841,651	157·0
1906 ...	329,521,648	508,700,269	291,563,048	1,129,784,965	6,908,298	163·5
1907 ...	356,233,666	589,745,792	330,000,000*	1,275,979,458	6,975,593	182·9
1908 ...	399,666,339	636,009,090	340,000,000*	1,375,675,429	7,043,540	195·3
1909 ...	410,744,610	687,138,908	311,000,000*	1,408,883,518	7,112,145	198·1
1910 ...	425,271,861	763,797,856	377,207,555	1,566,277,272	7,181,415	218·1
1911 ...	436,498,785	821,819,741	400,628,487	1,658,947,013	7,251,358	228·8
1912 ...	436,492,548	797,487,581	551,622,398	1,785,602,527	7,321,978	243·9
1913 ...	462,019,537†	811,397,317	733,931,201	2,007,348,055	7,393,280	271·5
1914 ...	462,019,537‡	846,000,673	756,591,847	2,064,612,057	7,465,278	276·5

* Number of passengers estimated on basis of receipts; the figures are believed to be underestimated.
† Figures compiled on basis of Railway Companies (Accounts and Returns) Act, 1911, and not strictly comparable with those for previous years.
‡ Figures for 1913 repeated, no later figures available.

Railway Electrification and Statistics.

The total length of railways open for passenger traffic in Greater London at the end of 1914 was 669·5 miles, as against 607 miles in 1903. Exclusive of halts there were 628 stations.

In the following table a comparison is made of the mileage and the number of stations for the years 1903, 1907, 1912, 1913, and 1914, with the addition of the proportions of mileage and stations to population and area:—

	In Greater London.				
	1903.	1907.	1912.	1913.	1914.
Length in route miles ...	607·3	667·4	668·8	669·2	669·5
Length per square mile	·88	·96	·97	·97	·97
Population per route mile	11,049	10,452	10,842	11,048	11,150
Number of stations ...	538	611	623	626	628
Number of stations per square mile	·78	·88	·90	·90	·91
Number of inhabitants per station	12,473	11,417	11,639	11,810	11,887

In a reference to electrification of steam railways in and around the metropolis it is stated that the work has been checked very considerably by the war. "The London, Brighton and South Coast electrical system was being supplied from abroad, and equipment has not been obtainable. It is understood that in spite of this some progress has continued to be made."

An account is given of various improvements on the Underground Electric Railways, including the provision of moving stairways at Baker Street to connect with the Baker Street and Waterloo Tube, and moving stairways and a concourse hall at Oxford Circus station. Similar stairways are shortly to be constructed at Trafalgar Square, Piccadilly Circus, and Tottenham Court Road on the London Electric Railway, and at Shepherd's Bush, Oxford Circus, and the Bank on the Central London. A future undertaking is the enlargement of the tunnels and other improvements on the City and South London line, which was the first electric railway to be opened in London. The report does not come up to a sufficiently late period to mention the opening of the electrified suburban railways of the London and South-Western Company, which were fully described and illustrated in our issue of November 18.

Motor Omnibus Details.

Owing to impressments for war service, the number of motor omnibuses fell from 3,064 in 1913 to 3,120 in 1914, and by June 15 last the total had declined to 2,602. By the end of 1914 over 4,000 workers had left for military duty. Nevertheless, the number of passengers carried in that year increased by 22,660,000, the aggregate being 756,591,000. Of the 2,602 mechanically propelled omnibuses, 2,310 were petrol, 175 petrol-electric, and 117 steam. In 1913 there were 2,826 tramcars, and 2,839 in 1914. Besides the omnibuses themselves, the military authorities had taken over a considerable part of the undertakings of the Omnibus Companies.

At the end of June, 1914, 9,953 motor cabs were licensed; a year later the figure was 6,638, a reduction of 3,315. This decrease is attributed to the war, many drivers having either rejoined the colours or enlisted.

During the year the London General Omnibus Company assumed control of the New Central and Metropolitan Steam Omnibus Companies. The omnibus companies now incorporated with the London General are the Associated British Automobile Traction (M.E.T.), South Metropolitan Electric Tramways and Lighting, Gearless, Metropolitan Steam, Thomas Tilling, and New Central.

Through bookings between the different systems—omnibus, train, and tramway—are in operation over many routes. Daily services are run into the country districts such as to Farnborough, St. Albans, and Reigate. Connections are made on the latter route at Merstham with the East Surrey Traction Company's omnibuses to Redhill, and at Reigate with the same company's omnibuses to Godstone, Dorking, Westerham, and Sevenoaks. The longest route in operation is No. 107 on Sundays, from Clapham to Dorking, a distance of over 20 miles. On weekdays the longest route is that from Stockwell to Reigate, 19·40 miles. Certain all-night services are run. The miles of roadway traversed in 1914 by the omnibuses was about 520 on weekdays, 550 on Saturdays, and 600 on Sundays. The number of fatal accidents during 1914 attributed to omnibuses was 124, or ·051 per vehicle, calculated on the average number of vehicles working. Fatal accidents per million miles run were 1·17, and per mile of route operated ·23.

Tramways Traffic.

In 1914 there were 158·72 street miles and 305·55 single track miles of tramways open within the county, while in outer London the figures were 195·09 and 350·95. The number of passengers within the county was 550,497,993; in outer London the number was 295,502,680, making a total of 846,000,673. The London County Council total is not strictly comparable with former years, as passengers taking a transfer ticket now receive only one ticket instead of one on each car. Only 24 street miles of the L.C.C. Tramways are on the overhead system.

A clause was incorporated in the London County Act, 1913, whereby the Council obtained power to carry on certain occasions an additional number of passengers, not exceeding one-third of the number of inside passengers that the vehicle might be licensed to carry. In 1914 this clause was amended to make clear that the section was intended to confine the power to carry additional passengers to one-third of the number of passengers in the lower saloon of the car. Only a small mileage of new tramways was sanctioned in the 1914 and 1915 Bills of the Council, and the carrying out of the work of construction has been suspended in consequence of the war. Clause 23 of the 1915 measure amends the Act of 1912 as to the use of trailer and coupled carriages, enabling those vehicles to be run over the whole system.

As showing the effect of converting a horse line to electric traction it is mentioned that passengers on the Tooley Street route increased from 438,604 in the last month of horse traction to 1,014,000 in March, 1915. The benefit derived from short extensions to traffic points is shown in the case of the extension from Norton Folgate (Bishopsgate Street) to Liverpool Street. With the city terminus at the first-named point, 127,558 persons were carried in one month, as against 491,413 after the extension. The report might have added that one or two similar extensions were included in the last Parliamentary Bill, but were rejected or withdrawn.

Hitherto workmen's tickets have shown a progressive increase annually, but during 1914-15 the number fell by 6,199,146. The report observes that the issue of cheap return tickets may tend to reduce the number of persons travelling by workmen's cars, and also to relieve the congestion at the early rush hours. No reference is made to the undoubted decrease of workmen entailed by the mobilisation of many thousands of Army Reservists and members of the Territorial Force. The maximum number of cars licensed at one time during 1914 was 1,620 electric, 13 trailers, and 22 horse cars. The 150 trailers on order are now being delivered.

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The mileage of electric tramways in Greater London in 1915 was as follows :—

Tramway.	Electric Lines Open for Traffic. Single Track Miles.	Route Miles.	Car Shed Track — Junction Lines.
London County Council	281·92	145·10	16·62
Middlesex County Council	80·30	43·15	2·66
Hertford County Council	3·00	1·50	—
London United Tramways, Ltd. ...	102·70	55·29	4·80
Metropolitan Electric Tramways, Ltd.	18·55	9·41	—
South Metropolitan Electric Tramways, etc., Company, Ltd. ...	26·22	13·26	1·14
East Ham Corporation	14·30	7·59	·46
West Ham Corporation	30·04	16·80	1·10
Croydon Corporation	10·70	11·02	·61
Ilford Urban District Council ...	11·35	6·66	·18
Barking Urban District Council ...	4·17	2·84	·13
Leyton Urban District Council ...	17·70	8·05	·55
Walthamstow Urban District Council	12·52	9·14	·60
Erith Urban District Council ...	8·44	4·71	·22
Lessees of Dartford U.D.C. ...	8·76	6·85	·55
Bexley Urban District Council ...	6·45	5·10	·28
City of London Corporation ...	0·48	0·24	—
Total	652·66	348·51	29·90

Length of Line Constructed on 31st March, 1915.

	Street Miles.
Double	141·0051
Single	10·3547
Total ...	151·3598

Systems of Traction.

	Street Miles.
Conduit	121·2203
Overhead	24·2334
Horse	5·9001
Total ...	151·3598

The following table gives the mileage of tramway lines and the number of tramway passengers in Greater London from 1903 to 1914 :—

Year.	Length of Line Open. Within the County of London. Street Miles.	Within the County of London. Single Track Miles.	In Outer London. Street Miles.	In Outer London. Single Track Miles.	In Greater London. Street Miles.	In Greater London. Single Track Miles.	Passengers Carried. Within the County of London.	In Outer London.	In Greater London.
1903 ...	115·18	205·92	73·74	121·55	188·92	327·47	299,209,364	95,147,167	394,356,531
1904 ...	119·35	213·08	103·66	177·77	223·01	390·85	311,691,157	120·122,682	431,813,839
1905 ...	117·73	213·66	131·37	220·33	249·10	433·99	324,854,380	153,090,304	477,944,684
1906 ...	117·59	219·04	160·31	303·51	280·90	522·55	316,980,310 (*a*)	191,713,959	508,700,269
1907 ...	126·80	234·12	177·13	319·51	303·93	553·03	372,515,754	217,230,038	589,745,792
1908 ...	131·57	248·53	179·93	323·81	311·50	572·34	412,913,881	222,195,240	635,109,121
1909 ...	136·47	257·70	189·78	343·61	326·25	601·31	451,439,216 (*b*)	235,891,425	687,330,641
1910 ...	146·90	277·35	192·68	355·33	339·58	632·68	504,715,326 (*b*)	259,082,530	763,797,856
1911 ...	149·75	286·91	195·16	356·42	344·91	643·33	533,440,235 (*b*)	288,379,506	821,819,741
1912 ...	157·74	297·03	195·65	356·01	353·39	653·04	512,052,653 (*b*)	284,834,928	797,487,581
1913 ...	157·86	299·03	195·65	356·01	353·51	655·04	522,952,640 (*b*)	288,444,677	811,397,317
1914 ...	158·72	305·55	195·69	356·95	354·41	662·50	550,497,993 (*b*)	295,502,680	846,000,673

(*a*) Falling off due to dislocation of traffic during electrification of London County Council Northern Tramways.
(*b*) Passengers carried by the London County Council only.

EXPEDITING TRAFFIC IN LONDON.

WORK OF THE COUNTY COUNCIL TRAMWAYS DURING THE WAR.

The Highways Committee, at the meeting of the London County Council, on August 1, presented a report representing some of the services rendered by the tramways in connection with the war. Many changes have been made at short notice in the services, owing to the redistribution of the centres of industry in consequence of the development of munition manufactories. These changes have been of the greatest service to the workers engaged in these industries. More than eleven and a half millions of passengers have been carried weekly, the great majority travelling to and from their work in connection with ordinary industry and commerce, while tens of thousands use the cars to reach the munition works in various districts. Of the various passenger-carrying services the Council's tramways were alone in a position to expand the normal services to an extent sufficient to meet the rapidly-growing needs of Woolwich. In July, 1914, just before the outbreak of war, the maximum number of the Council's cars arriving at a certain point during the busiest half-hour was 41 ; this number has now been increased to 86, an addition of 110 per cent. The number of cars arriving at the same point each day before the war was 975 ; the number is now 1,505, an increase of over 63 per cent. During the busiest hour to-day accommodation is provided for 13,088 people, compared with 4,094 before the war. Accommodation provided by motor omnibuses in this district, compared with that before the war, shows only a slight increase.

The service between Eltham and Woolwich is still being added to, and further augmentation of the services on the main route through Woolwich from the city termini to Abbey Wood would also be made but for the fact that the section of tramway in one of the main Woolwich thoroughfares, which consists of only a single line with passing places is already worked to its full capacity. The Council has for some time been in communication with Woolwich Council with a view to sections of single line being doubled, and although the borough council has consented to some of the projected doublings, it has declined to agree to doublings to which the greatest importance is attached, except on the conditions, which the Council would not be justified in accepting, that costly street widenings should be undertaken at a proximate date. If the consent of the borough council to these doublings could be secured on the compromise terms that the Highways Committee have submitted to the borough council, it would be possible at an early date to increase appreciably the existing very heavy service on those tramways. To enable the present additional services to be run, the sub-station at Woolwich has had to be enlarged and additional plant installed ; new cables between Greenwich generating station and the sub-station and between the sub-station and the tracks have been laid ; one section of the track has been doubled, and at three additional points further doublings are in progress. Other parts of London are not being neglected.

Authority has been obtained to carry an excess number of passengers, and this has proved a considerable help in meeting the needs of the arsenal workers. Women have been employed on work formerly done by men, more especially as conductors, the Commissioner of Police having agreed on October 20 to issue conductors' licenses to women. To-day there are 1,072 women conductors. The construction of trailer cars has been expedited as much as possible.

The tramways have been the principal means of meeting the great expansion and redistribution of passenger transit, owing to the altered conditions created by the war. The Highways Committee state confidently that no other form of transit could have provided so satisfactorily the increased facilities rendered essential by national requirements. If a comparison be made between tramcars and other forms of passenger conveyance, it will be found, the committee add, that the carrying of a given number of passengers involves the employment of a less number of employees in the case of a tramcar than in that of any other type of road conveyance, thus showing that the fullest possible use of tramway facilities is the most economical as regards labour incidental to passenger services using the roads. Although during the past two years the problem set before the management of meeting the requirements has been a difficult one, the needs of the country have been borne in mind ; the services of officers and employees have been lent to the Government for national work ; from the beginning of the war men have been encouraged to join the forces of the Crown ; substantial allowances have been made to the men enlisting or to their dependants, involving a charge on the undertaking of over £108,700, a sum that will be increased to over £200,000 by the end of the current financial year if the war continues until March 31, 1917.

A Manager Assists in Driving. Six married employees of Carlisle Tramways Company have been granted conditional exemption from military service, the company being so shorthanded that Mr. R. L. McCulloch, the engineer and manager, is obliged to give assistance in driving.

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Mr. J. S. D. MOFFET APPOINTED GENERAL MANAGER OF BELFAST TRAMWAYS.

On July 25 Mr. J. S. D. Moffet, general manager of West Ham Corporation Tramways, was appointed to a similar position at Belfast under the Corporation of that city. Mr. Moffet will take up his duties in September, when Mr. Andrew Nance retires and becomes consulting engineer to the tramways department. Before arriving at their decision the Council met in committee to receive the report of the Tramways and Electricity Committee, a deputation from which body had visited England and Scotland for the purpose of inspecting the tramway undertakings with which the candidates were associated. The committee had reduced the list of applicants to six, namely, Messrs. J. S. D. Moffet (West Ham), W. J. McCombe (Hull), R. S. Pilcher (Aberdeen), R. H. Wilkinson (Huddersfield), J. W. Dugdale (late general manager and engineer, Oldham Corporation Tramways), and J. F. Simpson (Preston). After considering the report of the deputation (Ald. J. Tyrrell, Councillors J. A. Duff and J. C. White), the committee recommended the Corporation to make their selection from Messrs. Moffet, McCombe, Pilcher, and Wilkinson. These gentlemen attended the meeting of the Council in committee, and each was interviewed. Upon a vote being taken, the choice fell on Mr. Moffet.

At the open meeting Councillor J. McCaughey, chairman of the Tramways and Electricity Committee, moved that Mr. Moffet be

Mr. J. S. D. Moffet.

appointed general manager at a salary of £800 per annum, rising by annual increments of £50 to £1,000, the engagement to be terminable on three months' notice by either party. The deputation, he said, came to the conclusion that Mr. Moffet would make an excellent manager. Alderman G. A. Doran, in seconding, expressed the hope that the appointment would result in bringing peace and harmony among the members of the committee. The resolution was unanimously adopted. The Lord Mayor (Councillor Sir Crawford McCullagh) heartily congratulated Mr. Moffet, and said he hoped that his selection would prove advantageous to Belfast.

The Belfast deputation reported as follows on their visit to West Ham :—"Although the population of West Ham served by the tramways is about three-fourths that of Belfast, and the car-mileage about two-thirds, it must be borne in mind that, while the other cities and towns which the deputation visited are, like Belfast, surrounded by country, West Ham lies among densely populated urban localities, whose populations are passing and repassing continuously over its roads, streets, and tramways, so that in our opinion the borough of West Ham afforded a test of tramway management not found elsewhere, and is the most severe criterion of tramway administration that your deputation met with where the supervision of the traffic, the maintenance of the overhead equipment, and the permanent way are under the same control and exercised to the satisfaction of the Council. The responsibility for the maintenance of the track has been recently transferred to the tramway manager at his express desire, and the arrangement of the staff appears to lead to harmonious working."

Mr. Moffet is by education and training a civil and mechanical engineer, and he has also the qualifications of an excellent business manager. As a controller of men he has also proved his capability, and he will leave West Ham as he left Rochdale, holding the esteem and respect of the staff and employees. Mr. Moffet succeeded Mr. H. E. Blain at West Ham in August, 1913, and of all the Metropolitan managers he has perhaps had the most trying time. Besides having to contend with omnibus competition, Mr. Moffet has earnestly and successfully worked to place the West Ham undertaking on a sound basis in the matter of fares. It was only a few weeks ago that the Council adopted his scheme for the abolition of the halfpenny fare and the institution of the universal penny fare. Acting upon his advice, the Council a year ago gave him the control of permanent way maintenance, for which work he secured an enlargement of his staff. Mr. Moffet is a native of Sunderland, and is 42 years of age. He received his technical education at the Heriot-Watt Engineering College, Edinburgh, and at the Durham College of Science, Durham University, Newcastle-on-Tyne. Later he entered the engineering works of Messrs. George Clark, Limited, Sunderland, and completed his training for the engineering profession under the borough engineer of Sunderland. In 1899 he was appointed chief engineering assistant to Mr. S. S. Platt, borough engineer of Rochdale, under whom he carried out a good deal of Parliamentary work, besides being responsible for the construction, with direct labour, of about thirty miles of tramway track. In 1904 he was appointed general manager of the Rochdale Corporation Tramways. He is an associate member of the Institute of Civil Engineers and a member of the Institution of Mechanical Engineers.

EDINBURGH AND ELECTRIFICATION.

Mr. J. B. Hamilton, general manager of Leeds Corporation Tramways ; Mr. J. A. Brodie, city engineer of Liverpool and permanent way engineer of the Corporation Tramways in that city ; and Mr. A. H. Campbell, the burgh engineer of Edinburgh, have presented to Edinburgh Tramways Committee an interim report on the methods of traction that might be adopted for the tramways, " keeping in view probable future extensions, with full information as to the probable costs of installation and working." The three gentlemen named state that they will submit a full report in September. The chief point on which the experts were asked to report was—" Is it practicable to arrange for a system of traction other than the cable being installed so as to be operated immediately on the expiry of the lease to the Tramways Company on June 30, 1919 ? " An affirmative reply is given, and the report adds that the Corporation may proceed with their arrangements independently of the Tramways Company. The next question was—" Would it be advisable to adopt a new system of traction for some of the routes, retaining the cable for other routes, and, if so, which ? " The answer is that it is desirable to have only one system.

Another question was—" Could the electric system be operated in such a way that there would be no overhead wires in the central parts of the city ? " The report states that such an arrangement would be possible, but that it could not be put into operation immediately on the expiry of the lease. The excavation for a conduit system would require considerable preparation, and would involve interference with the running of the cable cars up to June 30, 1919. It is suggested that the overhead system might be introduced all over, so that there would be no delay in securing a sufficient service, the formation of conduit sections being proceeded with later, if that is desired.

Dealing with alternative systems, the report refers to self-propelled cars, petrol, petrol-electric, and steam omnibuses, but none of these is advised in preference to overhead trolley traction.

A report presented to the Tramways Committee by the expert who has examined the 228 cable cars operated by the company, states that their condition indicates that upkeep has not had adequate attention. The under framing of the bodies appears to be sound enough, though the steel and iron parts are much corroded. There is no evidence to show that the under parts have been repainted since the cars were built. The amount of the wear in the brake work is much worse than the expert has seen on other tramways.

The Tramways Committee on July 19 referred the report to the City Council, and on the same date the burgh engineer reported that during the 42 days from June 5 to July 16, there had been 39 interruptions of the tramway traffic, the stoppages lasting from eight minutes to five hours.

When the interim report came before the Corporation on July 25, Councillor Harrison, convener of the Tramways Committee, stated that the Council would have until December 31, 1917, to make up its mind regarding the future of the tramways. The experts had reported that 200 new cars could be built in a twelvemonth. The present rails would do for electric traction, and for self-propelled cars, but would be worn out sooner than would be the case if of a heavier make. Personally he would advise the adoption of the conduit system for the centre of the city.

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FINANCIAL REPORTS AND MEETINGS.

Prudent Finance at Coventry.—The Corporation have adopted the Tramways Committee's recommendation that the balance at their disposal of £5,091 on the past year's working be applied as follows:—£4,000 to the reserve or renewals fund; £1,091 carried forward.

British Thomson-Houston Company.—The profits for 1915 were £262,361, while £13,797 was brought forward. After providing for interest on debentures, the directors recommend the transfer for reserves and depreciations of £144,878, and to carry forward £73,358, subject to excess profits tax.

Delhi Electric Tramways and Lighting Company.—The revenue for 1915 was £10,300, and the surplus for appropriation £6,113, which has been applied as follows:—In writing off preliminary expenses, £2,217; transfer to depreciation reserve account, £2,000; to renewals reserve account, £1,000; carried forward, £895.

Dublin United Tramways Company. The directors have declared interim dividends for the half-year at the rate of 6 per cent. per annum, less income-tax, on the pref. shares, and at the rate of 4 per cent. per annum, less income-tax, on the ordinary shares. The reduction of 1 per cent. on the ordinary shares is due to the loss of over £13,000 in the traffic receipts during the Sinn Fein rebellion.

Waygood-Otis, Limited.—The profit for the year ended March 31, 1916, is £12,798, making with balances a total of £14,544. Depreciation of plant, etc., absorbs £3,900, Otis amalgamation expenses £1,022, chairman and managing director's remuneration and directors' fees £6,542, and national service grants to the dependants of employees £2,396, leaving a balance to be carried forward of £671.

Belfast Corporation Tramways.—The Tramways Committee have received the city's accountant's report on the audit of the tramway undertaking for the year ended March 31 last. After allowing for all fixed charges and for the annual payment of £17,000 for depreciation, there remained to the credit of the appropriation account a balance of £7,861, which was transferable to the general purposes fund. The transfer was ordered to be made.

Edmundson's Electricity Corporation.—Mr. P. D. Tuckett, presiding at the annual meeting on July 20, said the war had affected almost all of their undertakings. As to the Scarborough tramway undertaking, the bombardment, followed by the air raids, had not only reduced the resident population, but was estimated to have deprived it of nearly 500,000 visitors. The tramway revenue had shrunk by 58 per cent. compared with 1914.

Kirkcaldy and Halfpenny Fares.—The net surplus on the Corporation Tramways for the past year was only £136, and it is suggested in the annual report that halfpenny fares should be abolished with a view to obtaining the increased revenue that will be required to meet the cost of permanent way renewals a few years hence. The total revenue for 1915-16 from 5,403,000 passengers was £17,433. Nearly 50 per cent. paid halfpenny fares, and there was a decrease of 90,000 in the total number of passengers.

J. G. White and Company, Limited. Mr. Wm. C. Burton, who presided at the annual meeting, stated that engineering constructional work in all parts of the world had been seriously reduced by the war. The profits for the year amounted to £17,380, against £19,772 in the previous year, and they recommended a dividend of 6 per cent. upon both classes of shares, leaving £34,939 to be carried forward, as against £29,559 in the preceding year. Methods for broadening the scope of the company's work, both at home and abroad, were receiving consideration.

Plymouth Corporation Tramways. The traffic receipts for the year ended March 31 last amounted to £65,009, and sundry receipts £870, and interest on investments £25, making a total of £65,905. The gross profit was £22,106, and after payment of capital charges and income-tax there was a net profit of £9,754. The Tramways Committee have decided to apply £9,022 in aid of the borough fund, and the balance of £732 to the reserve fund. These figures include the receipts and expenditure of the Devonport undertaking acquired by the Corporation on October 2 last.

Bombay Electric Supply and Tramways Company. The total revenue for 1915, including sale of current to the tramways, amounted to £310,770, an increase of 2·71 per cent. The total expenditure amounted to £142,091, a decrease of 2 per cent. The net profit aggregated £168,679, an increase of £11,096, equivalent to 7·04 per cent. The directors recommend a dividend on the ordinary shares at the rate of 7 per cent. per annum, free from all income-tax, carrying forward £9,603. For the two preceding years the dividend was 6 per cent.

Cape Town Consolidated Tramways Company.—The directors' report for the year ended December 31, 1914, showed a debit balance of £1,894 6s. 9d. This amount, added to the debit balance for 1913, makes a total of £9,997 15s. 8d., which has been carried forward. The loss has been incurred in connection with the undertaking of the Cape Marine Suburbs, Limited, one of the subsidiary companies. The operation of the Camps Bay Tramways resulted in a profit of £1,521 5s. 1d., against £1,599 2s. 3d. in the preceding year. The number of passengers carried showed a decrease of 7,052.

Rangoon Electric Tramways and Supply Company.—The report for the year 1915 states that the total traffic receipts were Rs.8,60,664, a decrease of Rs.32,252, or 3·61 per cent. In the lighting and power department the gross receipts for current amounted to Rs.7,32,172, an increase of 13·77 per cent. The gross profits were £63,347, and transfer fees and interest on deposits and investments in London yielded £1,307, making £64,654. Among the appropriations are the transfer to reserve for renewals account, £12,500, and to special reserve for cables, etc., £2,500, leaving £20,327, plus £2,769 brought forward. The directors recommend a dividend on the ordinary shares of 3 per cent. for the year, tax free, leaving £2,783 to be carried forward.

Middlesex County Council Tramways.—In their report for the year ended March 31, the Light Railways and Tramways Committee state that the receipts totalled £467,368, equal to an average of 9·79d. per car mile. There are 56¾ miles of route in operation, and the car mileage was 11,453,276 miles. The number of passengers was 93,325,170. Compared with the previous twelve months there is a decrease of £8,390 in the receipts and of 802,153 miles in the car mileage. The committee also reported that the recent strike among the Tramways Company's employees resulted in two millions fewer passengers being carried in the two weeks. The receipts the first week fell to £4,177 from £8,712 in the preceding week, and to £1,561 in Whit week. During the latter week in last year the receipts were £11,655.

Lisbon Electric Tramways Company.—Mr. L. Breitmeyer presided at the annual meeting. The traffic receipts, he said, continued to establish a record. The increased expenditure was due mainly to the higher cost of coal, labour, and supplies. Coal had gone up to nearly £5 per ton, against 22s. 6d. in pre-war times, an average of 42s. for the past year. The quality was also inferior. Their coal consumption was 20,000 tons annually, and they were studying the feasibility of substituting wood, partially or entirely. The increase in expenditure and the falling off in the rate of exchange had reduced the profits by £25,000, and the directors had been compelled to reduce the ordinary dividend from 6 to 4½ per cent. If conditions remained unfavourable, the question of approaching the Camara in Lisbon for permission to increase the fares would have to be considered.

Swansea Tramways Company.—At the annual meeting the directors reported that the revenue for 1915 amounted to £65,084, a decrease of £1,631. The traffic receipts amounted to £63,088, showing a decrease of £2,047. After setting aside £4,000 for renewals, there remained a surplus of £12,082. The directors proposed to place to reserve £3,000, to pay dividends on 984 preference shares at the rate of 6 per cent. for the year, on 4,016 preference shares at the rate of 5 per cent., and on 13,000 ordinary shares at the rate of 6 per cent. for the year, leaving to be carried forward £2,415. Mr. C. G. Tegetmeier, who presided, referred to the increased charges for materials, and said that the sum of £6,098 spent on repairs and maintenance was considerably less than for some years past. Owing to the high costs and the scarcity of labour, renewals and reconstruction were being deferred.

Potteries Electric Traction Company. For the year ended December 31 the revenue amounted to £136,167, of which £119,871 represented traffic receipts, being an increase of £4,788. There remained a balance of £40,871, as compared with £35,824 for 1914. With £1,698 brought forward, there was an available balance of £42,570, which the directors proposed to allocate as follows:—Reserve account, £8,035; renewals account, £10,000; dividend on preference shares, £12,250; dividend of 3 per cent. on ordinary shares, £7,350; carrying forward £4,934. Presiding at the annual meeting, Mr. R. J. Howley, referring to the negotiations with Stoke Corporation for a postponement of the date for the purchase of the tramways in the borough, regretted that the majority of the Corporation had not yet agreed to assure to the company the enjoyment of the property for a period sufficient to justify the expenditure on new works and improvements. The motor omnibus services had been steadily developed, and had proved a great convenience.

Calcutta Tramways Company.—Sir Henry Kimber, presiding at the annual meeting, said that the traffic receipts were £225,058, which showed a falling off of only £1,313. The working expenses were £118,189, or £2,683 less. There was thus a balance of working profit of £107,825. Compared with 1913 the receipts were practically the same. The expenditure showed reductions of about £1,300 in power and traffic expenses. There was an increase of £1,342 under the head of maintenance and repairs, due to improving the standard of track maintenance. The result of the working was a final dividend of 6s. 6d. per share, making 9¾ per cent. for the year, which would be paid, less income-tax, at the rate of 2s. 8d. in the £. That dividend was arrived at after making the usual contributions of £15,000 to the reserve fund and £1,309 to the provident fund. The receipts for the current year showed an increase of £4,721 over those for the same period in 1915. The undertaking comprised 35 miles of track. There were 245 trains and 10 trailers carrying 37,000,000 and upwards of passengers. They carried them 5,500,000 miles in the course of the year, in a maximum of 206 trains and cars

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run daily, and took in traffic receipts per train and car-mile in Calcutta 10·16d., while the expenses of running were 5·21d.

Nottingham Corporation Tramways.—The report for the year ended March 31, 1916, shows that the undertaking has passed very successfully through a year of exceptional difficulty. The comparative results are indicated by the appended summary, covering the past three financial years :—

	Year ended March 31.		
	1916.	1915.	1914.
Total capital expenditure ...	£735,382	£733,674	£667,705
Amount outstanding	£449,826	£473,999	£410,091
Total revenue	£195,392	£179,315	£175,379
Working expenses	£121,266	£112,583	£108,422
Gross balance	£74,126	£66,732	£66,957
Net profit	£33,500	£28,664	£31,013
Passengers carried	45,741,208	41,210,964	40,535,874
Fare per passenger	1·01d.	1·02d.	1·02d.
Car mileage	3,885,322	3,789,857	3,543,669
Units per car-mile	1·64	1·53	1·51
Power cost per car-mile ...	2·25d.	1·91d.	1·92d.
Receipts per car-mile ...	12·06d.	11·35d.	11·87d.
Expenses per car-mile ...	7·49d.	7·13d.	7·34d.
Ratio of expenses	62·10	62·78	61·82
Total track mileage	44·25	44·25	37·40
Number of cars in stock ...	155	155	135

Considerable permanent way renewals have been carried out, the total expenditure being £21,167. This amount has been charged to the reserve and renewals fund, which now stands at £50,375. Nine miles of overhead trolley wires, with the necessary fittings and span wires, were renewed, the cost being charged to working expenses.

Bradford Corporation Tramways.—The city treasurer has presented the annual statement of accounts relating to the working of the tramways in 1915-16. The traffic income amounted to £314,500, an increase of £9,500, and working out at 12·8d. per car-mile, against 11·8d. The traffic portion of the working expenses amounted to £88,000, against £87,100, or 3·6d. per car-mile, against 3·40d. The direct contribution to rates amounted to £15,700, an increase of £500; and in addition £25,000 was appropriated from tramway reserves in relief of rates, making a total contribution of over £40,000. Repairs and maintenance of the permanent way and cars cost over £5,000 less, but in allowances to dependents of employees £8,338 had been paid, being £5,554 more. For the trackless system the income was £8,780, representing 6¾d. per car-mile, as compared with 5¾d. in the previous year. The expenditure, inclusive of interest and sinking fund, amounted to £10,711, slightly less than 8d. per car-mile, as compared with 8¼d. the previous year. The car mileage run on the general tramways was 5,877,000, being 317,000 less; on the railless system it was 322,000, an increase of 145,000. This increase was largely accounted for by new routes having been opened. The net profit for the whole undertaking was £29,700. The committee expressed gratification at this result and appreciation of the good work done by the management and all branches of the service. There was a diminution of £5,000 for maintenance expenditure on permanent way and cars, and renewals cost only £6,000 as compared with an average annual expenditure of between £20,000 and £25,000. A substantial reduction should be made therefore from the year's profits because it had been impracticable to carry out work to keep the system in its usual high state of repair, work which must be undertaken when the present difficulties with regard to labour and material disappear.

Anglo-Argentine Tramways.—Mr. J. B. Concanon, presiding at the annual meeting, said that the Board regretted they could not recommend a dividend on the ordinary shares. Although the financial position was sound, enterprise in Buenos Ayres had been almost at a standstill. The high cost of freight and limited tonnage hampered both exports and imports. Up to April 30, although the receipts showed a falling off of only £32 compared with corresponding period in 1915, the expenditure was £33,495 more, entirely attributable to the higher cost of energy; and they would have to face a greater ratio of increase for the remainder of the year. Mr. Pedriali, the general manager, had effected substantial economies. The sinking fund for the redemption of the 5 per cent. debentures came into operation this year, and would entail a charge on revenue of £8,000. There was no foundation for the rumour that the company was "controlled" by Germans.—The report of the Anglo-Argentine tramways for 1915 shows gross receipts amounting to £2,709,615, less working expenses (which include various items amounting in the aggregate to £120,000 carried to the depreciation renewals reserve in addition to £265,692 expended on ordinary maintenance) £1,786,740, leaving £922,875, which, with interest on investments and deposits, £45,403, transfer fees, etc., £233, and the amount brought forward, £96,408, makes £1,064,921. Interest and charges absorb £970,801, leaving balance of net revenue account, £94,120. The receipts show a decrease of £141,380, and the expenditure has been reduced by £94,256, and now probably represents the minimum compatible with efficiency, while the position is aggravated by the continuous rise in the price of fuel, upon which the price paid for electric current is based. In these circumstances, and having regard to the difficulty of forecasting the results of the present year, the directors were unable to recommend the payment of a dividend on the ordinary shares. The balance at the credit of profit and loss, £94,120, has been carried forward.

General Electric Company, Limited.—The profits for the year ended March 31 amounted to £196,274, and £36,701 was brought forward. After deducting debenture interest and depreciation amounting to £27,259, a dividend of 10 per cent. is declared on ordinary shares and 6 per cent. on preference shares, transferring to the reserve £40,000, granting to dependants of men on active service £12,961, and leaving to be carried forward £48,053. The report states that the works have been mainly employed in the production of war material. Some 1,500 members of the staff and workpeople now serving at the front had to be replaced by untrained substitutes, and new workshops erected for special work. If the present results were satisfactory, they were entirely due to the devotion, initiative, and unremitting energy of the staff and workpeople. The capital expenditure on new works at Witton during the year amounted to £70,000. The export business recorded very large inquiries, but owing to well-known causes common to all exporters at the present time only a small proportion of the demand could be filled. Mr. H. Hirst, presiding at the annual meeting on July 17, said that the advance shown was all the more remarkable in view of the fact that a great portion of the previous year's output was for Government requirements, and the prices were almost without exception those ruling prior to the war; where advances had been asked for, they were in proportion to increased prices of material and labour. Increased profits were largely explained by more repetition work than could be expected in normal times. In some departments which showed annual pre-war loss there had been profits. The shell factory laid down by the company was in full swing. The deliveries had given the greatest satisfaction, but they had not yet succeeded in making a profit. This was no time to think of larger dividends; they must conserve their strength and keep their assets liquid. The stronger they made themselves the better they could wage the fierce commercial and industrial contest which was bound to follow the war. Through the Peel Conner Telephone Works they had established a magneto factory at Coventry.

Brighton Corporation Tramways.—After payment of interest, sinking fund charges, and income-tax, Brighton Corporation tramways have a balance in hand of £2,230 for the year ended March 31 last. The previous year the balance was only £18. A summary of the report is as follows :—

	1915-16.	1914-15.
Income	£57,936 4 11	£56,525 19 6
Expenditure	£41,001 0 8	£42,517 8 1
Balance	£16,935 4 3	£14,008 11 5

From these balances there had to be allocated interest, sinking fund, and income-tax, amounting in each of the two years to :—

Interest	£7,347 11 10	£7,660 13 4
Sinking fund	£6,429 8 10	£5,917 4 3
Tax	£965 10 1	£467 6 8
Totals	£14,742 10 9	£14,045 4 3

It was only possible to meet these charges last year from the fact that bank interest gave a credit of £54 15s. 5d., leaving £18 2s. 7d. to carry forward. This was allocated to reserve and renewals fund. Bank interest this year was £38 0s. 1d., which, added to the balance of £2,192 13s. 6d., gave £2,230 13s. 7d., which will doubtless be added to the reserves renewals fund, at present amounting to £3,235 13s. 5d. Other comparisons for the past three years are :—

	1915-16.	1914-15.	1913-14.
Electricity used	1,678,627	1,676,770	1,722,548
Car-miles run	1,053,285	1,108,352	1,156,584
Revenue per car-mile	13·202d.	12·24d.	11·79d.
Expenses per car-mile	8·47d.	8·91d.	8·80d.
Expenses to receipts	64·14	72·79	74·66
Passengers per mile	12	11	10
Passengers	12,295,198	11,837,828	11,339,515

Glasgow Corporation Tramways.—The financial year of the Glasgow Corporation Tramways, which closed on May 31, was marked by several exceptional features. As will be seen from the comparative abstract on page 118, the surplus to the common good, which is the sum remaining after the payment of all charges and reserves, and may be regarded as the net profit, amounted to £43,548, as compared with £12,951 in the previous year. This notable result has been obtained in spite of the fact that the payments to dependants of the men on active service and supplementary allowances have increased from £51,817 to £80,438. On the other hand, the traffic receipts show the very large expansion of £78,570, and against this there is only a relatively small increase in expenses of £8,834. A notable item in the accounts is the growth in the income-tax, which has risen from £22,789 to £39,853, an increase of £17,064.

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	1915-16.	1914-15.	1913-14.
Traffic receipts	£1,149,264	£1,070,694	£1,078,691
Sundry receipts	8,072	6,183	5,156
Total revenue	£1,157,336	£1,076,877	£1,083,847
Traffic expenses	£350,186	£345,625	£332,546
General expenses	144,297	142,020	134,034
Maintenance and repairs ...	133,659	144,530	156,214
Power expenses	64,346	51,995	53,483
Clydebank bridges	516	—	—
	£693,004	£684,170	£676,277
European War	80,438	51,817	—
Total expenditure	£773,442	£735,987	£676,277
Balance carried to net revenue account...	£383,894	£340,890	£407,570
Dumbarton Tramways	—	126	180
Interest on investments	81,203	65,700	64,809
Total	£465,097	£406,717	£472,559
From which there fall to be deducted : —			
Rent of Paisley lines	£6,700	£5,659	£5,830
Interest on capital	90,474	78,797	82,921
Sinking fund	109,614	105,491	102,607
Income-tax	39,853	22,789	14,057
Parliamentary expenses	500	8,817	609
Renewal and depreciation ...	174,408	172,310	212,642
Total	£421,549	£393,766	£418,666
Surplus to Common Good ...	£43,548	£12,951	£53,893

Sheffield Corporation Tramways.—The report for the year ended March 25, 1916, shows that the income was £455,609, and the working expenses £270,939, to which has to be added amount paid in war allowances to the dependants of employees, viz., £11,210. The gross profits are thus £173,460. The net amount of the charges for interest and sinking fund aggregate £63,818. Income-tax on profits was £13,862, an increase of £8,294. Deducting these charges there is a balance of £95,780, an increase of £25,840 over the previous year. The balance is appropriated as follows : — Street improvements, proportion of service of debt, £8,159 ; renewals fund (including interest on investments and bank interest), £30,115 ; accumulated surplus fund (including interest on investments and bank interest), £8,049 ; special purposes fund, £2,000 ; special grants to the Pure Science and Applied Science Departments of the Sheffield University, £5,000 ; capital account (special items of expenditure), £601 ; transfer to general district rate, £41,856. The expenditure on renewals of permanent way amounted to £10,833, a reduction of £12,739. Certain renewals work that would have been done in the ordinary course of events at an approximate cost of £10,000 has been postponed on account of the war. The motor omnibus section shows a balance of £3,816, which has been transferred to the special reserve fund to meet any future contingencies. The committee are now working a regular omnibus service on ten routes with a total length of thirty miles. Five of these routes extend over considerable distances beyond the city boundary. Since the beginning of the war 426 tramway employees have joined the forces. Practically every available man of military age attested, and arrangements are made from time to time with the military representative as to what men are to be released for army service and what may be retained. The number of employees is now 1,808. During the year free travelling facilities for wounded soldiers and Belgian refugees, etc., have been provided. The total number of these tickets issued amounted to 380,000, equal in value to £1,566. A summary of the reports for the last three years is appended : —

	Year ended March 25. 1916.	1915.	1914.
Capital expenditure ...	£1,554,201	£1,554,260	£1,521,438
Loans outstanding ...	£1,106,691	£1,122,482	£1,073,612
Total track mileage ...	79	79	78
Number of cars in stock ...	339	339	335
Traffic revenue	£449,946	£391,535	£386,059
Total revenue	£455,608	£396,229	£392,397
Working expenses ...	£270,939	£246,829	£232,761
War allowances	£11,209	—	—
Income-tax	£13,861	£5,566	£3,305
Total expenditure... ...	£296,009	£252,395	£236,066
Interest and sinking fund	£63,818	£73,893	£78,722
Balance on year's working	£95,779	£69,941	£77,607
Passengers carried ...	123,429,410	107,023,195	104,851,408
Average fare per passenger	·878d.	·878d.	·884d.
Car-mileage	8,867,726	8,810,252	8,883,576
Units per car-mile ...	2·173	1·979	1·933
Power cost per car-mile ...	1·765d.	1·347d.	·849d.
Traffic receipts per track mile	£5,688	£4,950	£4,884
Traffic receipts per car-mile	12·175d.	10·747d.	10·430d.
Expenses per car-mile ...	*7·333d.	6·724d.	6·288d.
Ratio of expenses to revenue	*59·926	61·116	59·732

* Excluding war allowances.

DIVIDENDS.

RIO DE JANEIRO TRAMWAY, LIGHT, AND POWER COMPANY.—One and a quarter per cent.

BRAZILIAN TRACTION, LIGHT, AND POWER COMPANY.—One per cent. on the ordinary stock.

SAN PAULO TRAMWAY, LIGHT, AND POWER COMPANY.—Two and a half per cent. on the common stock.

LONDON ELECTRIC RAILWAY.—Interim dividend for the first half of 1916 on the ordinary shares at the rate of 1½ per cent. per annum.

CHATHAM AND DISTRICT LIGHT RAILWAYS COMPANY.—Interim dividend at the rate of 3 per cent., less tax, on ordinary shares has been declared.

LONDON GENERAL OMNIBUS.—Interim dividend of 5 per cent., free of tax, on the ordinary shares for the half-year ended June 30, against 6 per cent. a year ago.

METROPOLITAN DISTRICT RAILWAY.—Interim dividends for the first half of 1916 on the second preference stock at the rate of 3 per cent. per annum, the same as a year ago.

BLACKPOOL AND FLEETWOOD TRAMROAD COMPANY.—An interim dividend at the rate of 4 per cent. per annum (4s. per share), free income-tax, on the ordinary shares for the half-year.

BRISTOL TRAMWAYS AND CARRIAGE COMPANY.—An interim dividend at the rate of 5 per cent. per annum for the half-year ended June 30 on the ordinary shares, against 4 per cent. a year ago.

LIVERPOOL OVERHEAD RAILWAY COMPANY.—At the rate of 5 per cent. per annum on the preference stock, and 2½ per cent. per annum on the ordinary shares, income-tax being deducted at 4s. 6d. in the £.

UNDERGROUND ELECTRIC RAILWAYS.—Interest on the 6 per cent. cumulative debenture stock, less tax, at the rate of 6 per cent. per annum, and coupon No. 17 off 6 per cent. income bonds, free of tax, at the rate of 6 per cent. per annum.

EDINBURGH AND DISTRICT TRAMWAYS COMPANY, LIMITED.—The directors intimate that they do not propose to pay any interim dividend on the preferred shares. In the preceding half-year a dividend of 3s. 9d. per share was paid.

CITY AND SOUTH LONDON RAILWAY.—Interim dividend for the first half of the year 1916 on the ordinary stock at the rate of 1½ per cent. per annum. Last year no dividend was paid on the ordinary stock, the last distribution being ½ per cent. in 1913.

CENTRAL LONDON RAILWAY.—Interim dividends for the first half of the present year on the undivided ordinary stock at the rate of 3½ per cent. per annum, and on the preferred ordinary stock at the rate of 4 per cent. per annum. A year ago the dividend on the undivided ordinary stock was at the rate of 3 per cent.

AN EXPERIMENT IN FUEL ECONOMY.

The Board of Trade has called attention to the increasing difficulty of providing supplies of coal to important consumers, and in view of the possibility of a serious shortage in the near future it is urged that every practicable economy in consumption should be adopted without delay. The London County Council is considerably handicapped at the present time in regard to its purchases of coal for use at the Greenwich station, as the stokers are only equipped for burning the better class of coal, the price of which is now about 32s. a ton The Highways Committee reported on August 1 that the arrangements at the boiler-house at Greenwich station have recently been considered by Messrs. Kennedy and Donkin, the Council's expert advisers in connection with the increase in the capacity of the plant, and they have pointed out that when the four new turbo-generators have been installed more steam will be required than the present boilers can supply, so that it will be necessary in the near future to fit ten of the boilers with grates having considerably larger area than the present grates. This would enable an increased output to be obtained, and a cheaper class of fuel to be used. By the use of coke the Council would be complying with the representations of the Board of Trade, and whether coke or cheaper coal were used, a very considerable saving would be effected. The Highways Committee recommended that an experiment should be immediately carried out by altering four of the existing boilers. They would then be in a position to decide in from six to nine months whether further alterations could profitably be undertaken. The cost of the work is estimated at £5,000. By burning a cheaper class of coal that expenditure should be recouped in a comparatively short period. No expenditure would be incurred without the sanction of H.M. Treasury having been obtained. The Finance Committee approved of the expenditure, and the report was adopted.

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CONTRACTS AND ORDERS.

Birkenhead Council have agreed to purchase a Daimler petrol motor tower wagon for the tramways department, at £820.

Glasgow Tramways Committee have accepted the offer of P. and W. MacLellan, Limited, for a three months' supply of iron and steel bars.

Sheffield Tramways Committee have accepted an offer received from Hadfield's, Limited, for the renewal of the tramway junction at Fitzalan Square.

Chloride Electrical Storage Company, Manchester, have a contract to supply a storage battery to London County Council in connection with the lighting of Woolwich tunnel.

Northampton Corporation Tramways have ordered a large number of seats for women conductors from the Equipment and Engineering Company, of 2, Norfolk Street, London, W.C.

Pinchin, Johnson and Company, Limited, of Bevis Marks, E.C., have been awarded a contract by the London County Council for insulating varnishes, etc., required for the tramways.

Hadfields, Limited, have received a contract for the supply and delivery of steel tires and axles for Salford Tramways Committee, and points and crossings for Bolton Tramways Committee.

Messrs. Walton and Clough, who obtained the contract to supply coal conveyors for the Southampton electricity works, have been permitted by the Ministry of Munitions to execute the order.

Herbert Morris, Limited, have received an order from Birmingham Electricity Committee for an overhead electric runway, including a travelling electric pulley-block and bogie trolley, at £421.

Messrs. John Cantor and Company, of Old Nichol Street, Shoreditch, London, E., supplied the new uniforms for the Portsmouth Corporation Tramways, to which reference was made in a previous issue.

Rotherham Council have placed an order with Messrs. Steel, Peech and Tozer, Limited, for forty tons of rails at £16 10s. per ton, in order to construct a double track in a portion of Westgate.

Willans and Robinson, Limited, Rugby, have received a contract to supply to Wolverhampton Corporation a 5,000 KW. Zoelly turbine, with Siemens generator, Rees Roturbo pumps, and Willans surface-condensing plant.

Bristol Council have accepted the tender of Fraser and Chalmers, of Erith, to supply a 3,000 KW. Fraser and Chalmers turbine, coupled to a Vickers alternator, and with condensing plant by the British Westinghouse Company.

Salford Council have accepted tenders for the supply of coal for the electricity works at prices ranging from 10s. 8d. to 18s. 4d. per ton, and for coal conveyors, bunkers, and chutes, by the New Conveyor Company, Limited, at £1,504.

Shepherd's Parging Block Company, Limited, have received an order for a large quantity of block parging from the Gloucester Corporation Tramways, and the company's block parging has been specified for two other Corporation tramway extensions.

The British Westinghouse Company have been given the contract for the supply of choke coils, etc., for turbo-generators at Greenwich generating station, and this contract has been made in addition to certain temperature alarms which were ordered to complete the installation.

Rawtenstall Council have placed a contract for a 2,000 KW. turbo-generator with James Howden and Company, Limited, and for condensing plant with Mirrlees, Watson and Company, Limited. The generator will be manufactured by the General Electric Company, Limited.

Luton Council have awarded contracts as subjoined:—Two boilers and stokers complete, £7,648, Clarke-Chapman and Company; economiser, £1,091, E. Green and Sons; coal-weighing machines, £440, W. & T. Avery, Limited; one water softener, £455, Harris Anderson Patent Feed Water Filter Company; rotary feed pump, £258, Hayward, Tyler and Company.

Buenos Ayres Western Railway Electrification.—Leeds Forge Company have received an order for underframes and bogies for motor coaches and bogies for trailer coaches now being constructed in England for the Buenos Ayres Western Railway. The value of the order is placed at about £70,000, and the work is in connection with the electrification of a section of the railway.

H. Bessemer and Company, Limited, have a contract from the London County Council for 500 driving-wheel tires, at £38 10s. a ton, and 250 pony-wheel tires, at £55 10s. a ton, less 2½ per cent. discount. These prices were for tires not tested to specification. The prices, inclusive of tests, were £40 and £57 a ton, less 2½ per cent. respectively, and as the tests are considered essential the latter prices were accepted.

Manchester Electricity Committee have placed the following contracts:—Coal stacker, supplied with 420 volt, a.c., three-phase motor, Fraser and Chalmers, Limited; three electric capstans, Sir W. G. Armstrong, Whitworth and Company, Limited; scrap cable and copper, B.I. and Helsby Cables, Limited; cables, Pirelli-General Cable Works, Limited; Western Electric Company, Limited; W. T. Glover and Company, Limited; Callender's Cable and Construction Company, Limited; British Insulated and Helsby Cables, Limited; Chas. Macintosh and Company, Limited.

PERSONAL.

Mr. T. Britten, manager of the Chelmsford works of Crompton and Company, Limited, has been elected a director of the company.

Mr. W. H. Allen has resigned the appointment of engineer and manager of Loughborough Corporation electricity department, and has accepted a position elsewhere.

Mr. F. P. Dolamore, assistant borough surveyor at Bournemouth, has been appointed to fill the vacant borough surveyorship caused by the death of Mr. F. W. Lacey. The salary is to be £550 per annum.

Mr. G. W. Watson, consulting engineer to the Commercial Motor Users' Association, has for some time been acting consulting engineer to the Munitions Mechanical Transport department of the Ministry of Munitions.

Mr. J. H. Balfour Browne, K.C., on his retirement from the Parliamentary Bar, has been elected a director of the Trafford Park Company and Railway. He has also joined the Board of the Trafford Park Estates, Limited.

Sir Albert H. Stanley, managing director of the London Underground Railways and London General Omnibus Company, is the chairman of the new Motor Transport Committee recently established at the War Office.

Mr. Ralph W. Kennedy, who for the past eleven years has acted as assistant editor of "Electrical Industries," has been appointed chemical engineer in the Aeronautical Inspection Department of the War Office. Throughout his career Mr. Kennedy has been closely associated with scientific and technical work.

Salaries of Coventry Tramways Staff.—Increases of salary have been granted to all the members of the Corporation tramways staff, the chief officers affected being Mr. H. A. Goodyer, chief clerk and accountant; Mr. E. P. Brown, traffic superintendent; Mr. J. Barry, permanent way foreman; and Mr. A. S. Neason, book-keeper.

Mr. A. E. Wray's work as general manager of the Luton Corporation tramways during the difficulties of the past year or so, was alluded to by members of the tramways committee at a recent meeting. He was complimented by the committee on the general improvement of the undertaking. The tramways are worked for the Council by Messrs. Balfour, Beatty and Company.

Mr. W. T. Stevenson, of the Pernambuco Tramways Company, is at home on a short visit. It is three years since Mr. Stevenson left London to take up the position of superintendent of the company's rolling stock. This now consists of 140 cars, and under present circumstances maintenance has been no easy matter in view of the scarcity of supplies. Mr. Stevenson will shortly return to Pernambuco.

Engineering Standards Committee.—At a special meeting of the main committee (Sir John Wolfe Barry, K.C.B., chairman), held on July 27 last, Mr. Charles le Maistre, A.I.Inst.C.E., M.Inst.E.E., who has been in charge of the work of the electrical section since 1903, was appointed secretary to the committee in succession to the late Leslie S. Robertson, M.Inst.C.E., who was lost with Lord Kitchener in the disaster to H.M.S. "Hampshire."

Mr. G. W. Shepherd, who on account of ill-health recently resigned the position of general manager of the Edinburgh and District Tramways Company, which he had held since 1906, and was appointed secretary, has now resigned that position. Mr. John Wiseman, who has been associated with the company for over thirty years, has been appointed secretary. Mr. Shepherd has had many difficulties to contend with during his management, and has shown himself to be possessed of resource and energy.

Mr. G. W. Knight, superintendent of the repair depot of the London County Council Tramways, has been given a grant of £50 by the Council. The Highways Committee had reported that Mr. Knight was appointed on the permanent staff in January, 1914, and among other duties has the supervision of a staff of 750 employees, his salary being only £300 a year. The committee propose to consider the question of his salary after the war, and they stated that its inadequacy is accentuated at the present time owing to the special work which Mr. Knight is performing for the Government. They therefore recommended that the above mentioned grant should be made.

British Electric Traction Personnel.—Mr. E. Garcke, chairman of the company, at the annual meeting said it was impossible to mention all the officers of the companies to whom acknowledgments were due, but there were two he could mention because, in addition to the high qualities they possessed, they were representative of the others, and it afforded him genuine pleasure to take this opportunity of thanking Messrs. C. H. Dade and R. J. Howley, the joint managers, and all the other officers they represented, for the excellent services they had rendered in their respective spheres. Mentioning that the burden of the heavy English income-tax had induced the

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shareholders of the Bombay Electric Supply and Tramways Company to move the direction and management to India, Mr. Garcke stated that Mr. C. Shirreff B. Hilton and himself had had the satisfaction of being associated with Sir Charles Ollivant, the chairman to the Bombay Company, for the past ten years. Sir Charles had consented to join the Board of the British Electric Traction Company. In securing him as a director the Board had rendered the company an important service. The meeting re-elected Mr. C. E. Tegetmeier and Mr. P. D. Tuckett as directors. The chairman remarked that Mr. Tegetmeier was chairman of the fund for maintaining the families and dependants of those who had joined the forces in approximately the same position as before the war.

Councillor G. H. Walker, of Stalybridge, whose death is announced, was a partner in the firm of William Underwood and Brother, contractors, Dukinfield. The firm constructed a number of tramways and many other public works during the past twenty years.

WITH THE FORCES.

Major W. A. Vignoles, of the Lincolnshire Regiment, and borough electrical engineer of Grimsby, was wounded during the fighting early in July.

Lieutenant R. E. Bullough, South Midland T.F. unit of the Royal Engineers, who has been wounded in France, is the son of Mr. R. C. Bullough, general manager of Colchester Corporation Tramways.

Second Lieutenant Jinks, Northamptonshire Regiment, has been wounded while directing the work of a machine gun section. He was a member of the testing staff of the British Thomson-Houston Company.

Sapper E. Jackson, who before the war was an electrical engineering student in the Preston Corporation tramways department, has been awarded a commission in a field company of the Royal Engineers. He had already won the D.C.M.

Lieutenant A. R. Courtenay has been in hospital at Malta for an illness that only temporarily incapacitated him from duty. Mr. Courtenay, who has of late been serving at Salonika, was formerly of the publicity department of the General Electric Company.

Second Lieutenant J. Austin Baker was recently promoted to lieutenant, and has been appointed to carry out workshop duties with the Welsh division in France. Mr. Baker, before enlisting in the Army Service Corps in January, 1915, as a lorry driver, was in the traction department of the British Westinghouse Company, Manchester, and for some years was assistant rolling stock superintendent of West Ham Corporation Tramways.

Second Lieutenant Broster, 6th Liverpool Rifles, who enlisted in 1914, was a clerk in the offices of Liverpool Corporation Tramways. Early in the war he was promoted to sergeant, and awarded the D.C.M. For a more recent act of gallantry he was granted a commission and another decoration. Six other clerks from the office have also been granted commissions, out of thirty-five clerks who enlisted at an early stage of the conflict. Three others have been killed. The total number of employees serving with the colours is 1,400.

Second Lieutenant F. R. Hoggett, who died on July 18 from wounds received in France, was formerly with Callender's Cable and Construction Company.

Captain G. C. Whitaker, Leeds "Pals" Battalion, who has been killed in action, was shortly to have married Miss Mary Hamilton, daughter of Mr. J. B. Hamilton.

Sergeant-Major J. C. Clay, a Manchester Corporation motorman, has been killed in action. He had served twelve years in the army, and re-enlisted in November, 1914. He had been recommended for the D.C.M.

Motorman W. R. Martin, Bristol Tramways Company, has been killed in France while working a machine gun of a local battalion. His officers have written of his "willing and daring service, unselfishness, and cheery helpfulness."

Company Sergeant-Major E. C. Laughton, who has fallen in action, was for nine years associated with the lamp and fittings department of Siemens Brothers' Dynamo Works, Limited. He joined the 8th East Surrey Regiment in September, 1914, as a private, and went to France early in May last year. He was well known to many members of the electrical industry, who will deplore the loss of a valued colleague.

Second Lieutenant E. L. F. Beatty, who was killed in action on June 24 on the Western front, was the eldest son of Mr. A. H. Beatty, of Balfour, Beatty and Company. He joined the ranks early in the war, and was gazetted in February last year. At the time of his death he was serving in the 73rd Trench Mortar Battery. Writing to Mr. Beatty, the commanding officer said: "He met his death bravely, going up into a heavy bombardment, his detachment being hit by a shell which killed him and four men. He was an exceptionally keen officer, and was liked and respected by all."

TRAMWAY AND LIGHT RAILWAY NOTES.

BELFAST.

ANNUAL ESTIMATE AND THE FARES.

The Tramways Committee on July 25 received from the city accountant the statutory estimate of the tramway revenue and expenditure for the year ending March 31 next, and the committee having considered this, and also, according to statute, the fares to be charged, passed a resolution recommending the Council to make no change in the present fares.

BRADFORD.

VOLUNTEER MOTORMEN—PARCEL CHARGES AND THE WAR—SUGGESTED BRADFORD-KEIGHLEY LINKING AND GOODS TRAFFIC.

The tramways department have now trained thirty volunteer motormen, who are rendering very acceptable service. In his annual report Mr. C. J. Spencer, the general manager, states that there is a probability of the scale of charges for parcels delivery on the tramways being increased, in consequence of the increased cost of running the department. Mr. H. Webber, general manager, Keighley Corporation Tramways, in his annual report says:—"It would appear that there is a prospect that the short distance existing between the Stockbridge terminus and the Bradford tramway terminus at Crossflatts will be stepped over in the near future. Such a linking up with Bradford would, in my opinion, have a very beneficial effect on the Keighley tramway undertaking. The amount of goods traffic taken from Keighley to Bradford by road is developing every year, and it seems to be a legitimate field for the tramway undertaking to handle such traffic, and thus reduce the number of private vehicles of all descriptions, which would have a direct saving on the wear and tear of the roads."

COVENTRY.

MEMORIAL TO TRAMWAY SOLDIERS—PRAISE FOR OFFICIALS AND EMPLOYEES.

To commemorate the names of the men of the Corporation Tramways Department who have lost their lives in the war, the Tramways Committee have decided to erect a tablet at the depot. Councillor H. W. Wale, vice-chairman of the Tramways Committee, in submitting to the City Council the annual report of Mr. T. R. Whitehead, the engineer and manager, acknowledged the loyalty, skill, and energy put into the undertaking by every member of the staff; they had been magnificent, particularly the women. Owing to the reduction of the staff the service had been materially decreased in the aggregate, but on one section where the ordinary service was eight cars they were running, particularly at night, twenty cars. While the number of passengers was nearly eleven and a half millions, the accidents were of a trivial character, although the traffic problem was one of the most complicated that obtained in any urban centre.

GLASGOW.

AN APPEAL FOR MORE WOMEN CAR HANDS—THE TRAINING OF WOMEN DRIVERS—OVERTIME SUGGESTED IN LIEU OF A WAR BONUS—EXPECTORATING FROM CARS.

Owing to the depletion of the male staff a further appeal has been made to women to come forward and fill the vacancies on both the front and rear platforms. There are already nearly 1,300 women conductors. The Scot has always been noted for his power of discernment. Apparently the latter quality is deserting the townsman in Glasgow, for we read that complaints have been received of disparaging remarks being made to men conducting cars which are driven by women. The explanation is that the men are motormen who are acting as conductors in order that the women may gain further experience and acquire confidence. Long as Glasgow has possessed electric tramways, there are evidently some of her citizens who do not know what an important part a good conductor plays in facilitating the work of a tyro on the front platform. The women drivers have gratefully acknowledged this form of help, and honour is due to the Glasgow motormen for the part they have taken in the training of the women. These drivers now number 140, and more are being trained. As an alternative to an annual expenditure of £47,845 that would result from granting the request of both sexes of car employees for a bonus of 6s. per week, Mr. J. Dalrymple, the general manager, has suggested that the 3,067 drivers and conductors be asked to work one hour longer per day. Their hours, he has reported, were shorter than on any other tramways, and the additional hour would give them from 3s. to 4s. 6d. per week. The question will be considered by the Corporation at the August meeting, when the Tramways Committee will recommend that the working hours be increased from 51 to 57, the extra six hours to be paid for at the rate of time and a half. The Corporation have been recommended by the Committee to make it an offence to spit from a tramcar.

LIVERPOOL.

STARTING OF CARS BY PASSENGERS.

There is no truth in a widely published report that nine Liverpool passengers have been fined for ringing the bell to stop cars while the women conductors have been on the top deck. The fines were inflicted for ringing the bell to re-start cars. It was

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because accidents had occurred from the practice that the prosecutions were instituted. Steps have also been taken to prevent men riding on the platforms in order to talk to women conductors. If passengers are really desirous of assisting the conductors, they can do so by adopting a suggestion of a tramway official that whenever possible the fare should be paid on the platform. Or the Tramways Committee might consider the advisability of calling for volunteers to be trained to discharge, during rush traffic, the duties performed at Manchester by bell boys and girls. The risk arising from permitting unauthorised persons to start the cars are very serious. Fatalities due to that cause are not unknown; one was recorded from a northern town in our issue of December 2 last. Moreover, claims for damages arising from similar mishaps cannot be resisted, as the authority would have encouraged inattention to duty on the part of the conductor by allowing passengers to re-start the cars.

LONDON.

ARBITRATION ON THROUGH RUNNING—DOCKS AND ARSENAL TRAFFIC—WOMEN CONDUCTORS.

Mr. J. M. McElroy, general manager, Manchester Corporation Tramways, has been selected by Messrs. Balfour, Beatty and Company and by Bexley Urban Council as arbitrator in the revision of the through running of tramcars between Bexley and Crayford. The Board of Trade having asked West Ham Council whether their scheme for doubling the tramway track at a certain terminus could not be postponed, the Tramways Committee replied that the heavy traffic from the docks and arsenal rendered the completion of the work a matter of urgency. Woolwich Council have agreed to the doubling of the County Council tramways at three places in Plumstead on condition that when widenings take place the track will be removed to the centre of the road. This concession is the outcome of the negotiations that have been in progress for several months with a view to facilitating traffic to the arsenal. The necessity for the doublings was urged in this column in October last before the Ministry of Munitions sought the advice of Mr. J. M. McElroy on the transit problem. Delay is still occurring, however, as regards the suggested doubling on the most important section, which the Ministry have asked for. The Borough Council urge that the Ministry and the County Council should bear the cost of the necessary widening. As the result of a conference with the Ministry, representatives of the County Council have expressed the authority's readiness to carry out the widenings within a term of years to be agreed upon, but the Borough Council, on July 26, asked that the period should be limited to one year after the declaration of peace. A large outlay has been made by the County Council in order to provide the additional electrical supply needed to increase the service.

MIDDLESEX.

LACK OF RAILS FOR PERMANENT WAY RENEWALS.

The surveyor to the Middlesex County Council has reported that in parts the tracks of the London United Tramways Company "are in a deplorable condition." The report adds:—"I have called the attention of the representatives of those areas, which are directly concerned, to the matter, who have informed me that owing to the war it is impossible for the company to proceed with a complete renewal of the tracks, owing to their inability to obtain new rails. I have pointed out to the district authorities their obligations under Section 11 of the Local Government Act, 1888, and that, as they are responsible for the satisfactory state of the roads from fence to fence, it is necessary that some steps should be taken in connection with the said tramways as soon as possible." On July 5 the surveyor to Hampton Wick Council reported that the company were about to carry out repairs in Hampton Court Road.

SHEFFIELD.

AUTOMATIC REVERSERS—A FORTY PER CENT. INCREASE IN TRAFFIC—EMPLOYMENT OF WOMEN.

At the termini of several routes automatic trolley reversers have been fitted, and the number is being gradually increased. It is expected that all terminal points will eventually be thus fitted. The new arrangement enables the poles to be automatically reversed without leaving the wires, and it has the advantage of maintaining the light in the car. Mr. A. R. Fearnley's annual report to the Tramways Committee refers to the severe tax of the department's resources to meet the demand for car and omnibus services in consequence of munition work. Records of passengers carried and total receipts have been made and broken week after week. On the Tinsley service there was an increase in the traffic of 40 per cent. It became necessary to employ women as conductors, and the only remaining men conductors are those unfit for motormen and not eligible for the army. Women are now engaged in car cleaning, and are gradually replacing men at this work. The number of women employed is over 700, the total staff being 1,807.

SOUTHAMPTON.

A CAR FOR SUMMER AND TRAILER TRAFFIC—NEW METHODS OF JOINT REPAIRING—ROLL OF HONOUR FOR TRAMWAY OFFICES.

A reference to the appreciation shown for the toast-rack type of car for summer traffic is made in the annual report of the general manager to the Tramways Committee. Mr. W. T. Robson also recommends that trailers of this type should be provided. Two new methods of joint repairs have been introduced during the year. One, the application of Thermit welding, has only been tried for this purpose on one system previously; the other method consists of packing all springing joints by driving in a species of resilient material and applying a waterproof cement to ensure that no deterioration can take place. The total number of joints Thermit welded during the year was 272. Early this year the permanent way was entirely reconstructed from the Dock Station to Holy Rood, and double track was laid down in the place of single track in Bridge Street, which has improved the time of the cars. The total cost was £4,207, this being at the rate of about £12,600 per mile of double track, an exceedingly satisfactory figure, as the manager observes, for war time renewal. A handsome Roll of Honour has been constructed in the tramway works out of oak timbers forming part of H.M.S. *Southampton*, which was built in 1806 and broken up in 1912. This occupies a prominent position in the tramway office, and will form a lasting memorial of the patriotism of the employees.

WEST HAM.

NEW MOTORS AND CONTROLLERS.

During the past year 21 single-truck cars have been equipped with new motors of the G.E. 200 ventilated type, which has now been adopted as the standard for the West Ham ordinary four-wheel single-truck type of car. In all 31 cars have now been fitted with T.2.G. controllers. This work has been done by the tramways department, in addition to the ordinary up-keep of the rolling stock. In his report the general manager, Mr. J. S. D. Moffet, says that plans have now been completed for putting in hand the work of reinforcing and where necessary reconstructing the car bodies as speedily as the circumstances will allow, but the lack of a sufficient renewals fund and shed accommodation retards the progress of the work.

GLASGOW TRAMWAY BATTALION.

COMPETITORS IN WAR EXERCISES "SOMEWHERE IN FRANCE."

The high spirit that animates our new army in France is shown by the fact that they make a sport of the exercises that fit them for their deadly work against the enemy. These events are held amongst brigades and divisions under the title of an assault-at-arms, with the result that the fighting efficiency of the units is greatly increased by the rivalry. Judging by the circumstance that the 15th Battalion Highland Light Infantry (Glasgow Tramways Battalion) recently came off easy victors at such a meeting, their adeptness at the real thing, coupled with the traditional Scottish gallantry, is likely to afford reason for congratulation to the Glasgow

Trophy won by Glasgow Tramways Battalion in France.

Corporation Tramways department for having recruited such a fine body of soldiers. Certainly the Tramways Committee and Mr. J. Dalrymple, the general manager, view with pride the prowess of the corps at the assault-at-arms, for Mr. Dalrymple has received for safe custody the cup that was the object of the rivalry. The trophy was the gift of General Compton, and a photograph of it is given on this page. How different the programme of the assault-at-arms was from events of a like kind during peace will be seen when we mention that the competitions included rapid wiring, relay race, tug-of-war, bomb throwing, bayonet fighting, Lewis, Vickers, and Stokes gun competitions, transport competition, alarm race, mule competition, and Victoria Cross race.

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KEIGHLEY RAILLESS TROLLEY SERVICE.

In his annual report on the Keighley Tramways, Mr. H. Webber, general manager and electrical engineer, states that the weather experienced from the beginning of November up to the end of the financial year, on March 31, was of the worst possible kind for electric traction The tramway track and the roads on which the trackless trolley vehicles run were in such a state as almost to stop the service. The amount of cleaning and overhauling during the period was also increased by at least 50 per cent. on a normal winter. Another exceptional expense was the allowance and war bonuses granted as a direct result of the war.

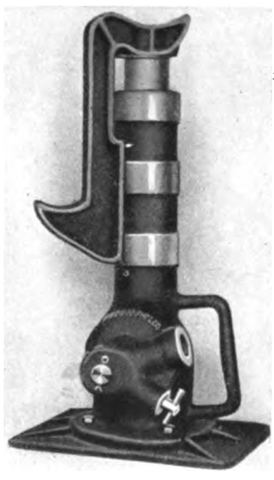
Although all the railless routes authorised under the Parliamentary Bill of 1912 had now been nearly completed, the amount sanctioned for expenditure under the Bill was £27,000, whereas the equipment up to date had only cost £18,134, leaving a balance of £11,848. This showed that the work had been carried out with the least possible expenditure of capital. At the present time the last length of the installation was well under way towards completion. The whole of the overhead construction was carried out at the contract price of £923 per route mile.

The net revenue account showed a surplus of £51, which had been carried to reserve and renewals fund account. The total revenue had been £4,973, on a capital expenditure of £18,134. The amount provided and set aside for sinking fund had been £965, making a total of £1,429 in hand for this purpose.

In our issue of December 9 last we published an illustrated and detailed description, written by Mr. Webber, of the railless undertaking, together with a map of the district. The routes were previously operated by motor omnibuses at a loss. The railless vehicles are of the over-running trolley type. The overhead equipment was supplied and erected by Messrs. Clough, Smith and Company, Limited.

BARRETT JACKS.

Barrett jacks, manufactured by the Duff Manufacturing Company, of Pittsburgh, have a well-established reputation for reliability. Their jacks are made in a great variety of designs, and purchasers have the assurance that the essential qualties of easy operation, quick lift, safety, and durability, are combined to the highest degree. In ball and cone bearing screw jacks the company have effected many structural improvements, with the result that in every recent test undertaken by users, their high efficiency and strength has been clearly demonstrated. These jacks are the strongest built for heavy loaded vehicles, while the operation is made remarkably easy owing to the greatly compounded leverage. Trucks on which the bodies overhand the axles considerably are most conveniently handled with this type of jack, as the load can



Ball and Cone Bearing Screw Jacks—Capacity, 10 Tons.

Automatic Lowering Jack—Capacity, 5 Tons.

be raised with low or short strokes of the ratchet lever, and the full capacity can be easily lifted with one hand.

Special attention has also been given to the improvement of the Barrett automatic lowering jacks. These are now made in various sizes with a lifting capacity up to 15 tons. The term "automatic lowering" is applied to this type of jack to distinguish them from the Barrett trip jacks which drop the load instantly. The automatic lowering jacks are ratcheted up or down, notch by notch, the direction being reversed by half a turn of the small eccentric at the side. This type of jack is particularly useful where a jack is placed upon each tramcar or light railway coach as part of its equipment, and it is extensively used for this purpose.

LONDON TRAFFIC GROUP.

ARRANGEMENTS WITH PUBLIC TRACTION AUTHORITIES.

In connection with the increase of fares on the Croydon Corporation Tramways, Alderman Allen, chairman of the Tramways Committee, has informed the Council that the London General Omnibus Company and the South Metropolitan Electric Tramways Company had agreed to fall into line with Croydon as soon as the new fare stages were instituted. Councillor Roberts suggested that as the undertakings were working on such friendly relations it might be possible for the omnibuses to have different stopping places from the cars, as the use of the same stopping places was a source of danger. Alderman Allen replied that the matter was one for the police, but the Tramways Committee would see what could be done.

In their report on the working of the London County Council Tramways for the year ended March 31, the Highways Committee set forth the through services instituted with the Metropolitan Electric Tramways Company two years ago, and state that on the through routes to North Finchley and High Barnet there are also through bookings with the London Electric and Central London Railways. The latter through tickets are available for travelling north of Highgate Station either by tramcar or by omnibus between the Archway Tavern and Fortis Green Road. The proportion of the through fares allocated to the Council is the ordinary tramway fare for the distance travelled by tramcar.

PATENT LIST.

Abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

*** If the inventions have been communicated the names of the communicators are given below in *italics*.

APPLICATIONS FOR LETTERS PATENT.

Carburetter (9,245)—C. H. Adams.
Trunk pistons of internal-combustion engines (9,201)—Albion Motor Car Company.
Wheel axles (9,067)—P. J. F. Batenburg.
Device for locking and releasing brakes (9,071)—W. F. Buck.
Automatic trolley alarm for electric tramcars (9,127)—R. Dodd.
Tool carriers for motor road vehicles (9,123)—C. Gouldesbrough.
Automatic trolley alarm for electric tramcars (9,127)—Horstmann Gear Company.
Speed indicators (8,976 and 8,977)—E. Jaeger.
Carburetters (9,217)—H. J. Owers.
Driving mechanism of motor road vehicles (9,070)—F. and F. W. Quarmby.
Lighting and heating of motor road vehicles, etc. (9,203)—W. F. W. Rhodes.
Wheels for road vehicles (9,207)—H. Street.
Differential gearing for electro-mechanical variable-speed mechanism (9,171) J. G. P. Thomas and the Thomas Transmission, Limited.
Route and stopping-place indicators for vehicles (8,948)—J. Wood.
Motor lorries (9,628) G. Moore.
Electric signalling systems (9,055)—F. G. Bell.
Driving gear for motor vehicles (9,528)—N. Bulkley.
Wheels for vehicles (9,363) J. J. Butcher.
Electrical signalling systems (9,055)—W. C. Davey.
Double-deck tramcars, motor omnibuses, etc. (9,339)—E. Hatton.
Motor vehicles (9,365)—R. F. Macfie.
Driving gear for motor vehicles (9,528)—W. March and D. W. Robertson.
Motor lorries (9,628) G. Moore.
Emergency steam brake apparatus (9,285) M. J. E. Moore.
Devices for gripping electric cables (9,371)—St. Helens Cable and Rubber Company, and J. C. White.
Life-guards for motor vehicles (9,460)—D. Shanahan.
Superheater boilers (9,867) Babcock and Wilcox (*Babcock and Wilcox Company*).
Regulators for polyphase transmissions systems (9,766 and 9,812)—British Thomson-Houston Company (*General Electric Company*).
Protection of Electric transmission systems (9,938)—British Thomson-Houston Company (*General Electric Company*).
Clutch control gear (9,930)—J. Brown, and Compayne, Limited.
Life-guards for vehicles (9,940)—S. C. Caddy.
Appliances for using paraffin with internal combustion engines (9,903)—A. Cox.
Electric accumulator containers (9,825)—B. M. Drake and the D.P. Battery Company.
Electrical signalling systems (9,750)—T. McLeod.
Protectors for motor car tires (9,901)—R. W. Muir.
Combined automatic and straight air brakes (9,704)—W. E. Pomeroy.
Multiple control apparatus for electric railways (10,099)—Akt.-Ges. Brown, Boverie et Cie.
Vessel to save waste of petrol from motor omnibus, etc. (10,345)—W. H. Beament.
Direction indicator for motor vehicles (10,002)—T. W. Bennett.

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Manufacture of blocks suitable for wedges for rails, sleepers, etc. (10,248)—R. Bowen.
Speed-changing mechanism of motor vehicles (10,189)—J. D. Dean.
Roller bearings for axles of railway vehicles (10,255)—R. G. Dobson. and J. Heppell.
Means for stabilising railway tracks (10,009 and 10,010)—F. Fabre.
Means for consolidating rail joints (10,012)—F. Fabre.
Ticket punches (10,245)—E. G. Judd.
Direction indicator for motor vehicles (10,281)—H. S. Neville, H. G. Osborne, and W. E. Trinder.
Control of petrol-electric vehicles (10,361)—P. F. Smith and Tilling-Stevens, Limited.
Electric signalling (10,558)—L. Cohen and G. O. Squier.

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Electrical driving for motor vehicles (10,491)—H. Crochat.
Paraffin-vaporising appliance for petrol motor engines (10,509)—E. Cummings.
Shock absorber for axles of tramway vehicles (10,669)—T. C. Winfield.

Specifications Published.

1915.

Starting mechanism for motor cars (8,365)—Fillettaz.
Fluid pressure braking apparatus (8,374)—Turner.
Convertible bodies for road vehicles (9,603)—Shepherd.
Points for tramways, railways, etc. (10,745)—Edgar Allen and Company, Robinson, and Larmuth.
Ticket punches (11,924)—Judd.
Car brakes (15,384)—Allison.
Motor vehicles (16,459)—Clayton and Shuttleworth, Limited, Robson, and Bretherton.
Repeater signalling apparatus for railways (17,353)—Louis.
Railway signalling systems (8,651)—Moore and Berry.
Electric motor control systems (8,748)—British Thomson-Houston Company and Martin.
Locomotives and other railway vehicles (9,050)—Spencer.
Trolley heads (12,848)—Taylor.
Anti-friction wheel bearings (12,972)—Chevrolet Motor Company of New York.
Projectors for motor vehicles (15,885)—Imray (*Robert Bosch*).
Springs for railway vehicles (9,257)—Glascodine.
Road vehicles (9,392)—Dawson and Buckham.
Non-skid device for motor vehicles (10,613)—Perkins.
Fish-plates (9,198)—Henry.
Rail joints (11,133)—Macer.
Steering gear for motor vehicles (12,970)—Chevrolet Motor Company.
Automatic slack adjuster for railway carriages (14,161)—Djurson.
Direction indicator for use on motor vehicles (16,770)—Edwards and Richards.
Side splash mudguards for motor vehicles (9,967)—Adams.

1916.

In the following list the numbers in italics are those that the specifications will finally bear and under which they will be indexed and abridged before acceptance and finally printed. The application numbers should, however, still be used for correspondence purposes.

Means for transmitting signals to railway vehicles (877—*100,582*)—W. F J. H. Bouman.
Starting mechanism for automobiles (198—*100,006*)—British Westinghouse Electric and Manufacturing Company, Limited.
Car couplings (749—*100,220*)—McConway and Torley Company.
Supports for railway rails (2,965—*100,724*)—W. P. Day.
Electrical systems for engines (4,688—*100,228*)—C. F. Kettering and W. A. Chryst.
Chairs for railway rails (5,626—*100,720*)—H Lumsdon.
Transmission gearing for automobiles (6,913—*100,816*)—G. V. Harriman.

Colonial and Foreign Tramways Traffic Returns.

NAME OF COMPANY.	1915. WEEKS ENDED.					1916. WEEKS ENDED.					AGGREGATE.		
	July 3	July 10	July 17	July 24	July 31	July 1	July 8	July 15	July 22	July 29	Wks.	1916.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Anglo-Argentine	48,158	52,553	49,999	49,235	47,136	46,726	51,679	54,578	49,729	46,346	31	1,528,391	– 3,223
Auckland	19,139	(28 days)	...	...	...	21,705	(28 days)	...	...	...	52	274,763	+ 7,515
Burma... ... ... Rs.	4,037	4,770	4,476	4,900	3,726	3,605	4,661	4,545	3,637	3,437	52	—	+ 3,920
Calcutta ... ... Rs.	65,884	69,560	69,948	68,754	63,240	67,102	71,200	70,104	68,933	66,960	31	2,018,893	+ 91,941
Madras ... ... Rs.	29,180	(2 weeks)	32,086	(2 weeks)	30,490	29,250	(2 weeks)	34,007	(2 weeks)	32,762	30	437,111	+ 31,700
Pernambuco	...	3,008	2,911	2,911	2,803	...	3,104	3,104	2,998	2,917	30½	89,108	– 5,398

Companies Issuing Monthly Statements.

	1915. Feb.	March.	April.	May.	June.	July.	1916. Feb.	March.	April.	May.	June.	July.	Wks.	AGGREGATE. 1916.	+ or – .
	£	£	£	£	£	£	£	£	£	£	£	£		£	£
Brazilian Street Mlrs.	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Brazilian Traction Mlrs	5797500	6294910	6333460	6670110	6591940	...	6079000	6711000	6678000	7091000	6961000	...	26	39,950,000	+2,265,890
Brisbane ...	34,050	30,740	29,890	31,780	29,880	31,150	30,320	34,275	32,575	33,510	31,390	32,880	31	227,230	+ 17,580
British Columbia $	558,512	557,135	540,861	512,568	498,093	...	572,935	577,117	549,046	542,353	529,078	...	52	6,602,624	– 703,939
Buenos Aires Pt. & C.	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Buenos Ayres Lacroze	38,877	44,332	41,765	44,480	40,421	...	39,137	42,219	40,220	41,503	36,213	...	52	490,818	– 15,324
Cape Town	...	...	...	...	...	...	...	14,994	...	...	12,920	...	—	—	—
Carthagena & Herrerias	1,882	2,436	1,496	1,931	2,059	2,157	1,585	2,991	2,513	2,927	3,512	2,371	31	18,740	+ 5,935
Cordoba	11,534	12,746	13,609	14,494	...	...	11 831	13:598	14 053	14,868	...	...	9	28,921	+ 818
East India	1,649	1,846	1,864	2,119	2,194	2,231	1,863	2,196	2,116	2,161	2,283	2,220	52	25,370	+ 1,586
Kalgoorlie	2,352	2,638	2,841	3,269	...	...	2,248	2,479	2,553	2,921	...	...	21	12,437	– 1,035
La Plata	4,016	4,582	4,269	4,489	3,875	4,054	4,346	4,613	4,354	4,343	3,735	3,909	31	29,835	+ 15
Lima	30,164	34,185	31,633	...	...	...	32,900	34 159	33,556	...	...	...	18	134,629	+ 5,614
Manaos	...	...	...	...	...	...	...	157,156	155,030	152,854	...	...	—	—	—
Manila ... ... $	...	119,984	117,450	...	...	...	...	124,750	124,350	...	...	...	—	505,381	+ 16,765
Melbourne	59,086	...	...	...	...	...	69,395	69,542	...	69,275	...	...	—	—	—
Mexico ... $	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Monte Video	30,008	29,716	26,786	27,771	24,266	25,161	32,502	31,956	28,997	28,349	25,300	25,220	39	266,288	+ 14,435
Port Elizabeth ...	...	...	...	...	...	...	3,857	...	...	2,809	...	...	—	—	—
Puebla ... $	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Rangoon	4,991	5,217	4,964	4,887	4,997	...	4,674	5,501	4,849	4,589	4,205	...	26	28,581	– 1,164
Toronto ... $	767,326	820,750	795,816	795,262	787,558	...	846,256	910,969	883,209	903,924	884,491	...	26	5,335,199	+ 525 136
Winnipeg ... $	314,658	303,209	264,856	263,302	255,549	...	293,252	296,500	282,498	276,980	254,686	...	26	1,701,474	– 50,782

(Continued on page 124)

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TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1915. WEEKS ENDED.				1916. WEEKS ENDED.						AGGREGATE.		
	July 3	July 10	July 17	July 24	July 31	July 1	July 8	July 15	July 22	July 29	Wks.	1916.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Aberdare U.D. Council	321	353	325	368	338	354	364	384	410	411	17	6,351	- 464
Aberdeen Corporation	1,753	1,869	1,783	2,053	1,885	1,834	1,998	1,841	1,865	2,267	8	15,395	+ 96
Accrington Corporation	548	569	559	537	649	561	547	583	555	667	17	9,914	+ 283
Ayr Corporation	414	487	608	1,051	628	385	470	503	745	710	11	5,066	330
Bath Electric	*	...	...	...	...	...	...	...	...	...	--	—	—
Birkenhead Corporation	1,452	1,461	1,438	1,438	1,459	1,556	1,623	1,531	1,531	1,673	17½	26,331	+ 2,104
Birmingham Corporation	13,365	13,189	13,828	14,143	14,285	16,322	16,263	16,615	16,529	17,145	17	281,498	- 49,317
Birmingham Corp. Motor Omnibuses	892	845	892	867	865	970	974	1,028	1,049	1,172	17	16,527	+ 1,921
Blackburn Corporation	1,319	1,193	1,250	1,420	1,561	1,263	1,206	1,194	1,300	1,648	17½	22,869	459
Blackpool and Fleetwood	1,237	1,108	961	1,346	1,586	893	1,583	1,234	1,526	1,822	30	19,587	+ 1,744
Blackpool Corporation	2,190	1,932	1,699	2,064	2,748	1,630	3,067	2,281	2,924	3,718	17	31,080	- 5,792
Bolton Corporation	2,955	2,786	2,868	2,901	2,887	2,826	2,915	2,788	3,093	3,083	18	50,522	- 2,742
Bournemouth Corporation	2,122	2,026	2,097	2,178	2,926	2,304	2,179	2,411	2,515	2,775	18	40,465	+ 1,530
Bradford Corporation	6,596	6,474	6,676	6,642	7,748	6,551	6,859	6,657	7,060	7,679	17	117,656	+ 330
Brighton Corporation	1,201	1,148	1,186	1,250	1,512	1,236	1,328	1,273	1,451	1,543	17½	20,886	- 1,323
Bristol	10,371	10,102	10,344	9,823	10,179	10,508	10,448	10,691	10,591	11,415	30	292,586	- 11,689
Burnley Corporation	1,758	1,700	1,569	1,610	1,662	1,601	1,665	1,587	1,685	1,799	18	30,761	- 1,143
Burton-on-Trent Corporation	292	317	306	301	322	270	286	266	286	292	17	4,578	543
Bury Corporation	1,405	1,301	1,366	1,440	1,429	1,344	1 403	1,383	1,581	1,554	18½	25,525	- 879
Cardiff Corporation	2,727	2,820	2,801	2,828	2,812	3 058	3,074	3,048	3,139	...	16	47,494	- 2,745
Chatham and District	1,295	1,366	1,336	1,303	1,317	1,317	1,341	1,343	1,336	1,396	30	34,946	- 1,279
Chesterfield Corporation	264	284	261	272	269	271	275	287	279	272	16	4,459	- 157
Colne Corporation	...	...	...	...	...	...	...	...	...	...	--	—	—
Cork Electric	560	590	540	514	551	567	581	542	589	619	30	14,747	82
Croydon Corporation	...	...	...	...	...	...	...	...	...	...	--	—	—
Derby Corporation	1,107	1,031	1,073	1,087	1,097	1,114	1,118	1,138	1 162	...	16½	18,232	- 801
Dover Corporation	332	348	343	360	364	321	347	338	...	...	15	4,747	20
Dublin and Lucan	134	190	164	165	158	199	167	186	195	204	4	752	- 74
Dublin United	6,834	6,421	6,310	6,530	6,073	7,274	6,464	6,629	7,034	7,629	30	173,427	6,822
Dundee City	1,379	1,428	1,355	1,425	1,550	1,377	1,359	1,340	1,408	1,480	10½	14,327	- 38
East Ham Corporation	1,304	1,404	1,351	1,351	1,321	1,390	1,405	1,346	1,347	1,414	17½	22,870	23
Exeter Corporation	389	409	403	414	417	389	405	403	438	467	17	6,636	74
Gearless Motor 'Buses	*	...	...	...	...	...	...	...	...	...	--	—	—
Glasgow Corporation	22,566	21,700	21,452	17 842	19 951	23,065	22,157	22,493	22,251	23,153	8½	197,248	- 16,049
Glasgow Subway	1,009	957	928	642	864	1,067	1,030	1,030	955	980	30	35,105	- 3,747
Glossop (Urban Elec. Supply Co.)	134	125	134	139	141	133	138	135	144	161	31	4,188	- 449
Halifax Corporation	2,202	2,209	2,203	2,240	2,350	2,234	2,275	2,226	2,180	2,630	16½	37,924	159
Halifax Corp. Motor Omnibuses	53	46	50	53	55	50	49	47	47	55	16½	791	73
Hastings and District	1,024	1,028	1,059	1,063	1,199	1,042	1,131	1,165	1,266	1,322	30	27,243	- 854
Huddersfield Corporation	2,753	2,628	2,652	2,849	2,893	2,832	2,974	2,892	2,962	3,381	17	47,877	- 4,206
Hull Corporation	3,048	2,902	3,044	3,115	3,121	3,184	3,234	3,279	3 288	3,238	17	53,768	- 221
Ilford U.D. Council	702	725	670	684	677	745	718	713	723	741	17	12,034	- 618
Ilkeston Corporation	132	136	142	140	171	133	147	135	155	159	18	2,475	- 75
Ipswich Corporation	640	650	625	649	675	619	669	615	550	567	17	9,405	- 64
Isle of Thanet	474	502	498	576	738	384	446	453	525	573	43	12,852	2,364
Kilmarnock Corporation	178	175	178	204	240	169	176	168	187	228	10½	1 891	97
Lanarkshire	2,009	2,115	2,012	2,627	1,973	2,372	2,371	2,255	2 478	2,676	30	67,120	- 10,222
Lancashire United	2 041	2 020	1,777	1,849	1,919	1,851	2,054	1,844	1,810	2,163	30	52,273	- 1,700
Leeds City	9,253	8,863	9,111	9,286	9,465	9,764	10,074	10,005	10,110	10,905	18	169,277	- 14,170
Leicester Corporation	*	...	...	...	...	...	...	...	...	...	--	—	—
Leith Corporation	805	825	831	858	828	850	852	914	951	1,043	10½	9,543	+ 831
Leyton U.D. Council	1,600	1,840	1,725	1,716	1,662	1,753	1,737	1,762	1,706	1,828	17	28,376	- 210
Liverpool Corporation	14,392	14,071	14,156	14,164	14,421	14,477	14,866	14,690	14,643	15,665	30½	416 130	- 18,060
Llandudno and Colwyn Bay	415	418	468	538	569	426	448	492	554	580	34½	9,938	- 213
London County Council	44,534	47,297	46,405	46,999	...	49,001	49,616	49,514	48,584	...	15½	755,621	- 98,068
London General Omnibus	*	...	...	...	...	...	...	...	...	...	--	—	—
London United	*	...	...	...	...	...	...	...	...	...	...	—	—
Lowestoft Corporation	*	...	...	...	...	...	...	...	...	...	--	—	—
Maidstone Corporation	234	245	224	223	235	210	245	222	214	226	17	3,685	120
Manchester Corporation	18,798	17,824	18,045	18,218	18,221	20,674	19,320	19,055	19,429	20,477	17	297,032	+ 36,996
Metropolitan Electric Tramways	*	...	...	...	...	...	...	...	...	...	--	—	—
National Steam Car	*	...	...	...	...	...	...	...	...	...	--	—	—
Nelson Corporation	196	228	185	217	230	210	181	200	230	258	17½	3.744	+ 280
Newcastle-on-Tyne Corporation	6.412	6,484	6.546	6,642	6,633	6,753	6,993	7,129	7,125	...	16	105.345	+ 3,884
Newport (Mon.) Corporation	875	901	883	857	862	904	935	930	1.001	1.009	17	15.884	+ 1,073
New St. Helens and District	1,096	1,155	1,072	1,074	1,108	1,039	1,081	1,083	1,030	1,289	4	4.240	+ 68
Northampton Corporation	825	784	817	804	805	701	716	695	691	738	17	11.873	1,486
Nottingham Corporation	4.581	4,498	3,844	3,839	3,770	3,907	3,852	3,993	3,888	4.150	17	65.261	+ 373
Oldham Corporation	2.236	2,406	2,420	2,444	2,427	2,400	2,460	2,462	2,806	2,702	20	46.110	+ 2,69½
Portsmouth Corporation	2.605	2,727	2,498	2,601	2,899	2,754	3,042	2,886	3,019	3,319	18	47.652	—
Preston Corporation	977	1,000	967	976	998	1,042	1,091	1,126	1,029	1,132	16½	18.218	+ 1,839
Provincial	2,447	2,424	2,411	2,457	2,623	2,464	2,684	2,633	2,698	2 913	43	95.205	+ 5,162
Reading Corporation	814	858	823	814	815	836	847	875	844	...	15½	13 026	+ 451
Rhondda Tramways	1,170	1,215	1,187	1,192	...	1,299	1,298	1 358	1,339	...	29	35.649	2,114
Rochdale Corporation	1,772	1,683	1,764	1,808	1,945	1,647	1,810	1,785	1,914	2,085	17½	31.700	832
Rotherham Corporation	1,158	1,171	1,165	1,187	1,425	1,571	1,591	1,548	1,647	1,660	17½	26.294	+ 5,923
Salford Corporation	5,332	5,292	5,429	5,413	5,587	5,654	5,759	5,468	6,137	5,945	17½	97.470	+ 4,901
Sheffield Corporation	8,654	9,015	9,151	9,098	9,126	10,742	10,828	10,679	10,990	10,992	18½	189.037	+ 31,413
Southampton Corporation	1,474	1,624	1,566	1,554	1,519	1,679	1,716	1,657	1,710	1,838	16½	27.048	+ 1,913
Southend-on-Sea Corporation	737	838	836	837	874	895	960	1,010	1,019	1,146	17	14.352	+ 439
South Metropolitan Tramways	*	...	...	...	...	...	...	...	...	...	--	—	—
South Shields Corporation	834	793	823	832	877	809	849	896	904	992	17½	14.115	+ 406
Sunderland Corporation	1,559	1,526	1,572	1,597	1,647	1,613	1,644	1,708	1,834	1,985	17	27.916	+ 1,580
Sunderland District	605	577	565	592	...	630	591	602	647	...	38	22.126	+ 1,157
Swindon Corporation	196	211	206	204	199	198	194	201	192	216	16½	3.337	7
Torquay Tramways	493	593	551	559	605	604	604	635	701	763	30	15.544	+ 530
Tramways (M.E.T.) Omnibus Co.	*	...	...	...	...	...	...	...	...	...	--	—	—
Tyneside Tramways and Tramroads	768	644	651	675	659	629	489	675	703	...	3	1.867	- 104
Wallasey Corporation	1,392	1,352	1,420	1,463	1,576	1,388	1,472	1,438	1,539	1,779	17½	23.746	+ 738
Walsall Corporation	781	762	797	807	783	826	827	824	833	859	31	24.289	+ 2,620
Walthamstow U.D. Council	957	1,103	993	1,011	998	1,133	1,147	1,129	1,128	1,247	17	18.837	+ 2,477
Warrington Corporation	469	483	458	471	464	491	497	495	477	...	16	7.685	+ 509
West Ham Corporation	3,081	3,324	3,239	3,176	3,108	3,304	3,322	3,346	3,259	3,386	16½	55.281	+ 2,252
Wigan Corporation	1,546	1,601	1,567	1,637	1,578	1,628	1,679	1,673	1,680	1,763	17	28.281	+ 1,695
Wolverhampton Corporation	1,119	1,114	1,160	...	...	1,197	1,239	1,224	...	...	16	19.140	+ 1,655
Yorkshire (West Riding)	1,542	1,680	1,567	1,635	1,776	1,869	1,783	1,710	1,831	1,980	31	52.923	+ 4,722

* TRAFFIC RETURNS SUSPENDED.

Owing to the European war, the Government have taken over the railways of Great Britain as from August 4, 1914, and the issue of traffic returns has been suspended. Consequently the traffic returns of the electric railways which usually appear on this page cannot be given.

The Publication of the Traffic Returns of the Tramways marked with an asterisk in the above table have also been suspended during the war.

TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officials and the principal particulars relating to each undertaking.

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DAIMLER
Commercial Vehicles

WE have repeatedly stated in our announcements that the Daimler Sleeve-Valve Engine requires no attention whatever (beyond oiling) for a minimum of 20,000 miles.

Here are the records of three Daimler Commercial Vehicles in the service of "County Carriers" in the St. Helens District.

32,000 miles without inspection.
50,000 miles without requiring attention.
52,000 miles without attention.

Such continuity of service, as every experienced user of motor traction knows, is the prime factor in reducing maintenance costs to an absolute minimum.

It is peculiar to the Daimler Sleeve-Valve Engine which is *different* in design and in principle, and in results superior.

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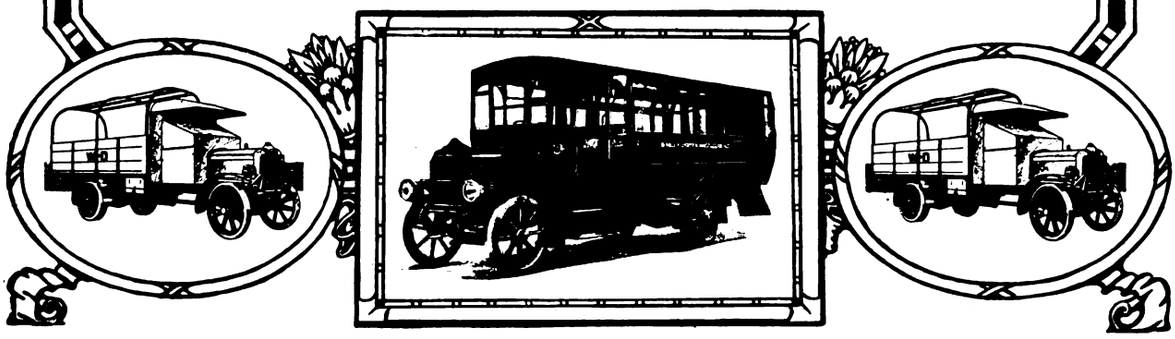

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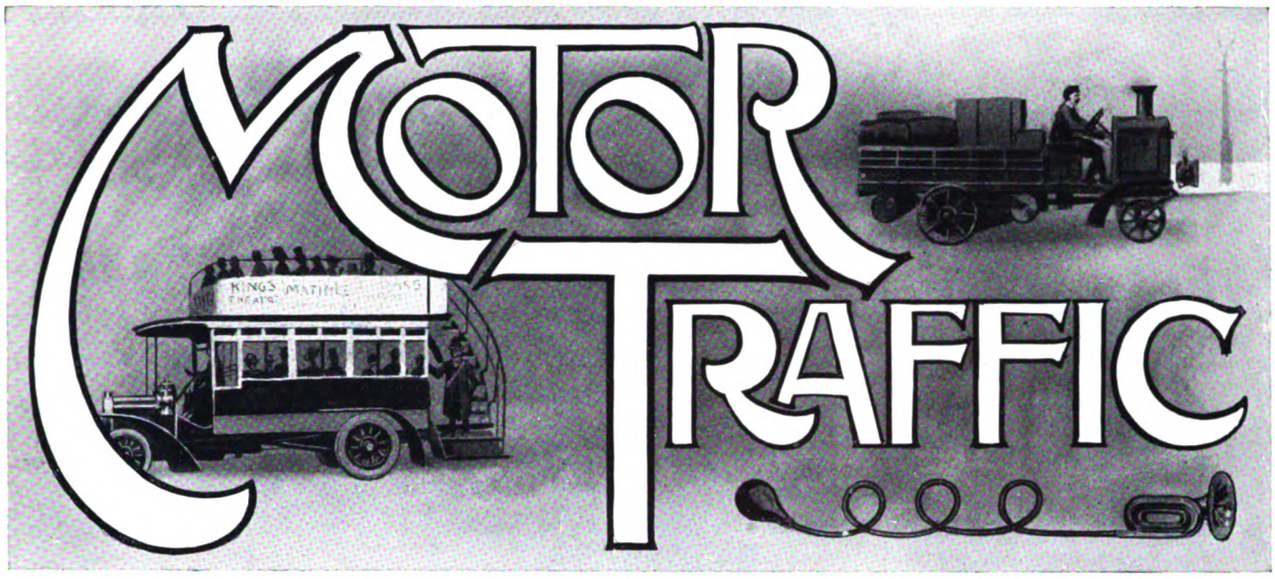

For those who have the ownership or management of fleets of utility motor vehicles it may be difficult to extract consolation of any kind from things in their present condition. The shortage of petrol is not, from anyone's point of view, a minor matter. The petrol situation represents the most substantial of any of the inconveniences or deprivations that we have had to face as a result of the war. That things are all that is vexatious and chaotic is only too obvious, but they have their redeeming feature, and it is this: the public at large is about to learn, as it has never learnt yet, the real value of motor transport, and what it means to their daily existence. The sudden curtailment of the delivery facilities for goods and the withdrawal of passenger services in London and elsewhere are bound to prove very formidable eye-openers. The public will be brought to realise that motor transport is truly indispensable, and that its maintenance and development are matters of first-rate importance. Thus the greater mass of the people—as distinct from the expert and directly interested few—may be brought into closer touch with the motor fuel question. That in itself would be a great step forward, and an ample compensation for all of our trials and tribulations. The question of fuel supplies for internal combustion vehicles has been a live and crucial issue for some years past. Its essential importance has never at any time received adequate recognition from the State, and one of the reasons is that it has always presented itself, plausibly, at least, as a minor issue, and one in which only a very few were interested. Consequently motor transport was left to take care of itself, and to struggle as best it could against the various circumstances by which the price and supplies of fuel in normal times have been influenced. We are reaping now some of the inevitable consequences of this policy of inaction on the part of the State, however excusable or inexcusable it may be, and if the present scale of restriction and curtailment of motor transport should become so extended and serious as to constitute a great public issue, some good purpose may after all have been served.

* * * * * *

One recognises the enormous difficulties of the Petrol Committee's task, and the impossibility of proceeding on any but rough and ready lines. Where there is legitimate ground for complaint is in the fact that the Committee was not set up long before the date on which its formation was first announced. The Government must have had some idea that there would be a shortage of petrol so soon as the operations of the armies in the field, and their consequent necessities, assumed certain dimensions, and to have left the necessary measures for dealing with this position to so late a date suggests lack of foresight, or, what is more likely, perhaps, entire failure to realise the elementary facts of transport conditions as they exist to-day. It must be remembered that the public is more dependent on motor traffic now than might ordinarily have been the case. The wholesale requisitioning of horses at the outbreak of the war led to a good many firms buying motor vans, so that in scores of cases we are confronted with the spectacle of important commercial businesses being unable to obtain a sufficiency of either motor or horse delivery service. Apparently what the Committee has endeavoured to do is to give some proportion of petrol to all comers. This line of action is excellent in theory, but, if its results are to be such that, for instance, firms supplying foodstuffs to hospitals and camps are to be allotted quantities of spirit on which it is quite impossible to "carry on," if the delivery of materials urgently needed for munitions is to be impeded, the sooner we drop this "quota" system the better.

* * * * * *

There can be no justification in giving even a pint of petrol for ordinary motor cycles or pleasure cars while the transit facilities of London and elsewhere have to be cut down. These facilities were considerably restricted before the question of petrol shortage arose. The process of discrimination can, of course, be carried considerably farther, if needs be. Obviously there is no case to be made for permitting petrol to be used in conveying small parcels, or luxury goods, if essential commodities are thus to be held up; the cabs can be more readily dispensed with in an extreme resort than can the omnibus. Again, there is no apparent justification for another mile to be run by pleasure chars-a-bancs while things remain as they are. It may be urged that some share-and-share-alike method must be adopted, and that people should not be compelled to close down their businesses. It would, however, be a far sounder policy to suspend the running of all unnecessary motor vehicles and to compensate those affected than to proceed on the rather happy-go-lucky lines that have been followed up to the present time. No doubt some of the muddles will straighten themselves out in due course, but it is a pity that the whole question was not thoroughly investigated before action became necessary.

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MOTOR TRAFFIC.

The proverbial slowness of legal machinery is strikingly illustrated by the case that was lately decided in the House of Lords concerning the liability of a railway company to maintain bridges over its lines in a state fit for the heavy traffic of to-day. Over two years ago an action was brought by the Attorney General (on the relation of Pickfords, Limited) for an order requiring the Great Northern Railway Company to maintain a certain bridge in a London suburb in a state fit to bear the traffic that might reasonably be expected to pass over it. It was heard before Mr. Justice Warrington. The bridge was built some 50 years ago, when traffic conditions were very different from what they are now. While admitting their liability to maintain it, the company contended that that liability was limited to the structure as it was originally built, and that they were not called upon to strengthen it on account of the increased weight of traffic now common on the roads. The anomalies arising from this position are obvious, and it simply means that a comparatively weak bridge might hold up the transit development of a whole district. Something of the kind, in fact, has happened in this particular case. Mr. Justice Warrington found against the company, but his judgment was reversed by the Court of Appeal a year or so later, which decision has now been affirmed by the House of Lords. It is, doubtless, sound law, but it can hardly be said that it leaves matters in a satisfactory state from the point of view of road traffic and its future. No doubt some of its difficulties can be overcome by negotiations, in due time, between railway companies and road authorities, but the former cannot be expected to go out of their way to do more than they are legally obliged in connection with schemes for facilitating competitive means of transport. Thus the road authorities may find themselves saddled both with the cost of reconstructing and maintaining bridges over railways in many places, since the company's liability to maintain can hardly extend to entirely new structures in which they have no part or lot. On the other hand, it will not be at all difficult for county councils and public bodies generally to make out a clear case of special expenditure incurred on account of the demands of heavy motor traffic, and in the event of any legislative action becoming eventually necessary, owners of heavy motors will be lucky if they do not find themselves involved in extra taxation on that account.

THE PETROL PERMITS.

Under regulations imposed by the Finance Act the petrol licence system came into force on August 1. It makes an additional tax of 6d. a gallon, except on spirit used by trade cars, while medical and veterinary practitioners are charged half rate. A penalty of £100 is the punishment held out for persons who obtain or attempt to obtain motor spirit without a licence, obtain or attempt to obtain more than a licence allows, or who use motor spirit supplied for a special purpose indicated on a licence for any purpose other than that indicated. A similar penalty is threatened for supplying spirit to an unlicensed person or supplying to a licensed person more than he is authorised to obtain. The supplier has to enter his name and address, the date, and the amount supplied on the licence of every person supplied.

Great dissatisfaction has been aroused by the Petrol Control Committee's curtailment of supplies to commercial vehicles. It is at the rate of 50 per cent., and the only satisfaction is the announcement that licences may be varied at the end of three months.

The London General Omnibus Company have now suspended or varied some two dozen of their services; they have also started two new services from certain districts to the munition centre.

To demonstrate the necessity of the Government's action, Mr. Harcourt, President of the Board of Trade, made a statement in the House of Commons on August 1, when he showed the need for conserving the supply for the use of motor transport at the front. He stated that two Sundays ago, on a wet day, 600 civilian cars were counted on the Brighton and Maidenhead roads, and that the Government might have to resort to a total prohibition of Sunday motoring. No race meetings would be licensed after August 10. The restriction in the supply was due to the great increase of the consumption during the war and to the diminution in the number of oil-carrying ships, a large number of which had been taken over by the Admiralty in order to provide for the needs of oil-driven battleships completed for sea during the past year. Mr. Harcourt also remarked that if he could describe what the recent advance in Picardy meant in the way of petrol, his statement would stagger the House. Strict regulations had been imposed on the use of petrol for military and naval cars on home service.

An unofficial announcement was made on August 1 that on July 31 the Petrol Control Committee met a gentleman connected with a Colonial firm outside the petrol syndicate in regard to his offer to supply 4,000,000 gallons of petrol per month. The firm are prepared to provide eight tank steamers for the purpose.

BRITISH CHEMICAL SUBSTITUTE FOR PETROL.

The owner-drivers' branch of the Licensed Vehicle Workers' Union has made a successful test of a new chemical substitute for petrol. It is a British production, and the Union has ordered 100,000 gallons at half the cost of petrol. It will be on sale to the members as soon as it is delivered. The owner-drivers have been trying a mixture of paraffin and petrol, which answered well for a day, but the next morning it delayed the "starting up." After a mixture of equal quantities of petrol and the new fuel had been used the vehicle was allowed to stand all night, but the starting next morning proved entirely satisfactory.

ELECTRICAL VEHICLE COMMITTEE.

The report on the work of this committee during the year ended March 31, 1916, was presented at the annual meeting of the Incorporated Municipal Electrical Association. The membership of the committee includes eight representatives of the Association, and also representatives of 13 other interests, including Mr. A. R. Fearnley, of the Municipal Tramways Association, and Mr. A. V. Mason, of the Tramways and Light Railways Association, while Mr. F. Ayton, engineer and manager, Ipswich Corporation Electric Supply and Tramways, has been the indefatigable honorary secretary since the formation of the committee three years ago. In addition to the two tramway organisations, other bodies that during the past year accepted invitations to become represented on the committee were the Institution of Municipal and County Engineers, the British Electrical Federation, Limited (represented by Mr. R. J. Howley), and the Garage Proprietors. Makers of electric vehicles are represented on the committee as follow:—Messrs. E. W. Curtis, General Vehicle Company, Limited, J. F. Monnot, Arrol-Johnston, Limited, A. E. Meaden, Wolseley Motors, Limited, P. A. Mossay, Sims and Jefferies, Limited, while Mr. W. H. L. Watson represents Edison Accumulators, Limited.

The report stated that many new vehicles had been put into commission during the year, so that at the present time the estimate of vehicles in use in the United Kingdom is about 080. This number includes 48 electric warehouse or works trucks, the use of which is likely to considerably extend in the near future. It is noteworthy that 33 municipalities operate between them, or have on order, 78 vehicles. The total number of vehicles quoted above shows an increase during the 12 months of 197 vehicles.

Reference was made to the various activities of the committee during the year, as reported from time to time in this journal, and it was stated that the committee had received an invitation to elect a representative to sit on the Tire and Road Wear Research Committee of the Society of Motor Manufacturers and Traders. The committee had become affiliated with the Electric Vehicle Section (formerly the Electric Vehicle Association of America) of the National Electric Light Association of America.

The financial statement showed an expenditure of £469, and a balance in hand of £45. Of the income, £129 was derived from subscriptions by municipalities, other associations, companies, and private individuals. Twenty-seven municipalities and councils and six electric supply companies were among the subscribers. The committee, of whom Mr. R. A. Chattock is the chairman, expressed "their thanks to Mr. Ayton for the very able and efficient manner in which he has handled the work of the committee."

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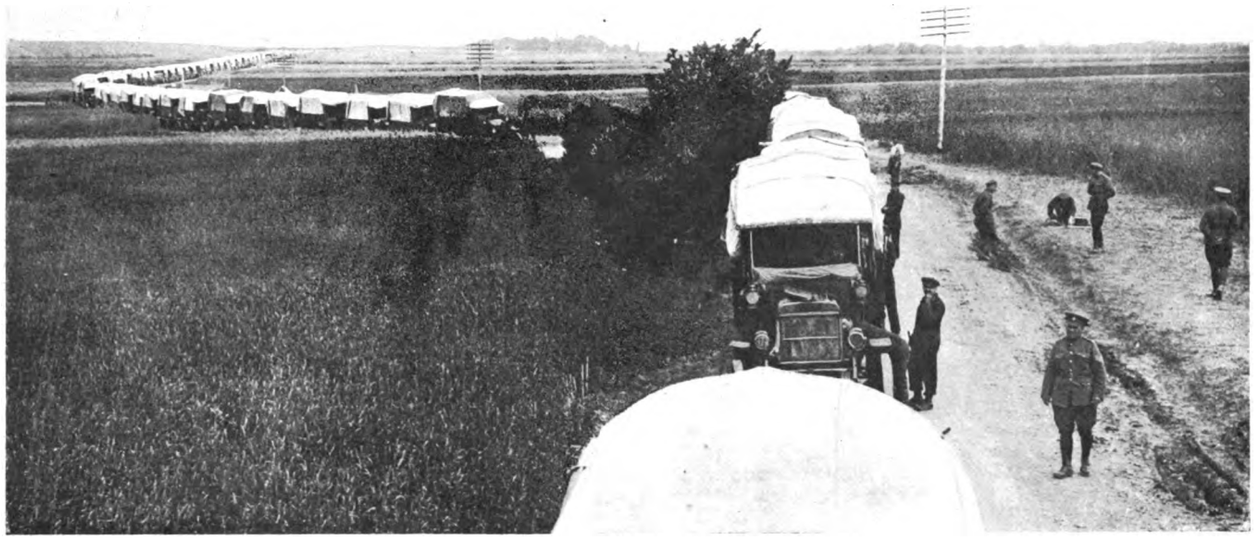
MOTOR TRAFFIC.

MOTOR TRACTION IN THE WAR.



First Claim for Petrol—One of our many Supply Columns in France.

The restriction placed upon the civilian use of petrol in this country since August 1 affords an opportunity for again calling attention to the invaluable work that is being performed by motor vehicles for the Allied armies. We have already related how in the early days of the war Field Marshal Lord French's army was transferred in motor vehicles many miles from one position to another in the Allied line, thus enabling the British to defeat an attempt to break through. Reference has also been made to the use of motor transport for moving the French force out of Paris and flinging them at the flank of von Kluck's army, with the result that the effect was felt at the battle of the Ourcq, which was the turning point of the German advance upon the French capital. Since then the British and French motor services for the conveyance of troops, munitions, and food have become the greatest transport organisations in the world. At the same time great attention has been paid to the development of power and animal traction on tramways and

Advance of the Guns—3-Ton Lorry Hauling a Howitzer Across a Field.

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MOTOR TRAFFIC.

light railways, while great use is found for the horsed regimental transport in the vicinity of the trenches leading to the front line. It is easier to clear away the debris and to prevent obstruction if a light cart instead of a motor vehicle is hit by shell fire. It has been estimated that there are 60,000 army motors of all kinds on the Allied fronts, and that 34,000 of the machines are of American manufacture. An indication of the work performed was given in the remarks made by the President of the Board of Trade on August 1 in reference to the petrol problem. Mr. Harcourt referred to the important part played by petrol in our present advance and also during the defence of Verdun. In the latter area motor transport had to be solely relied upon, as the enemy's artillery and bombs had destroyed all the lines of communication immediately to the rear of the French lines. Large supplies of petrol were contributed by this country, notwithstanding that in order to conserve their own supplies the French have imposed more severe curtailment of civilian use than has at last been adopted in Great Britain. One fact that serves to limit the supplies of motor fuel in both countries is that every drop of benzol and alcohol is appropriated for the manufacture of explosives. The part that motor vehicles played at Verdun was recognised by General Joffre in a special order. On one occasion an army corps was moved in 5,000 wagons from Bar-le-Duc to Douaumont in ten hours, and a few days later another huge force was transported in the same wagons. For over two months the French were entirely dependant on motors for the supply of everything required by the quarter of a million men who were engaged in the defence of Verdun. Over an area of 90 miles the convoys were passing at average intervals of 20 seconds between each vehicle. The time has not yet arrived to refer in detail to the work of the British motor transport in the present advance, but it may be stated that the carefully devised plans have been carried out without a hitch. An American correspondent has referred to the continuous maintenance of ammunition and supplies as the result of " the most perfect thing in the way of motor transport yet developed."

AUTOMOBILE EXPERIENCES IN THE WAR.

Information Useful to Makers and Drivers.

Among the papers read at the annual summer meeting of the American Society of Automobile Engineers was one submitted by Mr. W. F. Bradley, the European correspondent of the *Commercial Vehicle* (New York). It bore the title, "Automobile Experiences in the Great War," and is published in full in recent issues of that journal. From it we make the following extracts, which, however, do not exhaust the interest of the paper either for makers or users of the commercial vehicles that have played an invaluable part in the work of the British and French Armies. For the most part the author's statements are to be regarded as applying to American and French vehicles.

The author observed that the war had not been in progress more than a month before France, the nation that had most carefully studied the use of motor trucks in war, had sent an official to the United States with instructions to buy several thousand trucks; England, with a greater number of commercial vehicles than any other nation, was also anxious to supplement her military fleet with trucks from across the Atlantic. The trucks available were ordinary commercial vehicles, built for commercial conditions in the United States, without their designers or manufacturers ever having conceived that they might some day be employed on war service. These purely commercial trucks were put to work side by side with the more specialised European machines, and although they were all open to improvement in some or many respects, they all gave—and are still giving—good service in the war zone.

From this it must not be assumed that any ordinary truck is fit for war work, that there are no special military requirements, and that no lessons have been learned during neary two years of war. The point to be enforced is the uselessness of trying to develop a special type of truck to meet purely military requirements, without any consideration of commercial service. The proportion of motors attached to European armies will never again fall as low as it was prior to August, 1914. Of necessity a certain number of purely military vehicles will differ from the commercial vehicle as much as a battleship differs from a cargo boat; but the great bulk of the motor trucks for any future war will be the commercial trucks of the nations involved.

British and French Subsidy Vehicles.

Before the war the British authorities had designed a subsidy type of truck. Admittedly a good vehicle for military purposes, it had been designed with such disdain of commercial service that few business houses would purchase it. When England went to war less than fifty of these army subsidy trucks were to be found in the whole of Great Britain. Then the requisition officers gathered in practically everything on wheels. It was a jump from one extreme to the other, for many of these hastily-requisitioned trucks never got within sound of the guns.

The French system was much less drastic. The military authorities, instead of saying dogmatically what were and what were not good features of army truck design, left these matters largely to the engineer, and were content principally with imposing working conditions. If a truck could fulfil these conditions, it would be accepted as an army subsidy vehicle, no matter whether it had worm or chain drive, whether its motive power was obtained from steam, gasoline, electricity, or from a combination of these. In the end this tended towards uniformity, for it automatically eliminated unsuitable types. But it did not bar a manufacturer who failed to see eye to eye with the military expert on the question of final drive, or who refused to give up his preference for a particular type of wheel bearing or gear box.

The problem was, and ever will be, one of directing design into such channels that the whole of the nation's commercial trucks could be applied to purposes of war. This application must be possible, however, without interfering with the primary usefulness of the trucks as commercial vehicles. It is a matter of compromise. If the truck is highly specialised for some class of commercial work, it will probably not be of great value on war duty; if it is designed only to meet military requirements, the ordinary customer will refuse to buy it, either with or without the offer of a subsidy.

For instance, in France it was considered that the most suitable military type was a 2-ton truck. But the commercial user was not satisfied with a 2-tonner and would have preferred a vehicle with a 5-ton load capacity. Thus a compromse was struck with 3½ tons, and it is this capacity of truck that has proved most suitable under actual war conditions. It is not so light as to be constantly threatened with overloading; it is capable of hauling one or more trailers; and its dead weight is sufficiently low to enable it to operate over poor road services. For the general conditions of war service the 5-ton truck has too great a dead weight.

For certain special classes of work it has been found that a 4-ton truck gives the most efficient service. This model has not been produced in great quantities in Europe, and, curiously, is not found in America. Manufacturers in the United States have specialised on 3-ton models, but have not produced any intermediary model between this and the 5-ton truck. The demand for a 4-ton is comparatively recent; it does not alter the general statement that the bulk of the work is best done by the 3½-ton vehicles. This refers to conditions obtaining prior to 1915. Since the war great changes have taken place in American catalogues.

Light weight, consistent with strength, has been shown to be essential. The French truck, as it has been developed up to the eve of war, had to weigh not more than 3½ tons, 7,716 lbs., this including the entire truck with its body, water, gasoline, oil and hoops capable of receiving a suspended load of 2,645 lbs. In reality the weight was nearly always below the maximum, some of the trucks scaling as low as 5,730 lb., and the average being just under 6,200 lb. The tendency since the war has been toward a further reduction in weight. Such bodies are of the platform type, with movable sides and detachable canvas top on reinforced hoops, the hoops being used as a support to carry a portion of the load—generally wounded men.

Four-cylinder Engines for all Ordinary Purposes.

Four-cylinder engines are insisted on, and these have been found quite sufficient for all ordinary purposes. Some of the heavy tractor engines have six cylinders, but their number is small. The French military authorities have never made any attempt to impose cylinder dimensions. It was in the interests of the manufacturers to get the smallest engines capable of doing the work, for fuel consumption was taken into consideration. The small engines of two or three years ago, however, have been found unsatisfactory. Moreover the requirement that each truck should be capable of hauling a fully-loaded companion up a macadamised 8 per cent. gradient, has tended toward a slight increase in piston displacements, and also toward certain modifications in gear ratios. Statistics of eighteen different makes of French army type trucks that went into service August, 1914, show that the average bore was 3·9 in., and the average stroke 5·7 in. The biggest engine measured 3·9 by 6·69 in. and the smallest 3·5 by 5·5 in. bore and stroke respectively.

All engines are carried under a hood. There are a few exceptions, which tend to prove the rule, notable among them being the Paris omnibus type of chassis. These vehicles, however, are used exclusively for carrying troops. On such work the greatest possible body area is required.

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MOTOR TRAFFIC.

In passing it may be mentioned that the internal combustion engine has proved itself without a rival for military transportation. No gasoline-electric systems have made good. [The author gives no grounds for arriving at this conclusion. It is a well-known fact that the petrol-electric vehicle manufactured by Messrs. Tilling-Stevens, of Maidstone, has for years proved its reliability and low working costs in omnibus work in London, Birmingham, and elsewhere, while it is also extensively used for haulage. During the war the firm have had to refuse civil orders for the reason that their whole output has been taken by the Government, and notably the Admiralty for searchlight and gun vehicles, etc.—ED., *T. and R.W.*] The tendency is toward a reduction in the number of steamers. Even the British, who have always shown a partiality toward steam, are making comparatively little use of it in France, although steam tractors are much in evidence around the camps in England.

The Final Drive Problem.

Under the French military regulations every type of final drive was admitted; the English military subsidy specification called for worm drive. Those partisans who looked to the war to settle the question of final drive are likely to be disappointed. At present motor trucks are in service on the front with straight bevel drive, double reduction bevel, worm, internal gears, and side chains with and without housings. No one type has shown itself incontestably superior to all the others, and so far as it is possible to estimate their opinion the higher authorities have no intention of imposing the adoption of any particular type of final drive. The motor vehicle department of the French army has carefully compiled statistics dealing with parts supplied to trucks in service, but it is likely they will be used only to determine the makes that have been most economical and satisfactory, and not which type of design is superior. These data are closely guarded, and even if given out would be useless without explanations. One poorly-built make of truck would be quite sufficient, for instance, to discredit a particular type of final drive if statistics were examined without a complete understanding of them.

While the question of final drive will remain unsolved by the war, it being left to commercial users to work out this problem, the writer is of the opinion that chain drive will gradually disappear before worm, internal gear, and double reduction bevel axles. This is not intended to infer that the chain has given more trouble than its rivals. Under certain conditions of operation unprotected side chains constantly plough through a bed of mud, and although they can get through it is at the cost of their chains.

Some Defects and Requirements.

It is not an easy matter to generalise on defects revealed by war service. There is not a make of truck but has developed some weak point—it may be of minor, it may be of major importance. To quote all these would tend to give the impression that motor trucks are a hotbed of trouble, whereas few of the defects are applicable to more than one or two makes. For instance, one American worm-driven truck cracked its axle housings; this was a case of faulty design, and was a particular and not a general defect. A light American truck literally ate up differential drive shafts; this was traced to poor material. A French chain-driven truck warped its differential casing under heavy braking stresses. Another had shed timing gears mounted on bearings of insufficent size. Vibration ensued, and the gears were reduced to what the mechanics termed "marmalade." A more general complaint was the breakage of canvas and leather universal joints, it being not uncommon to see drive shafts flung across the road during heavy pulling in sand and mud.

Spring troubles were fairly general, but in only a few makes did the breakage of a front spring entail the smashing of the crank chamber. In these makes when the frame dropped the base-chamber came in contact with the axle. Also, spring failures were almost invariably confined to the front, it being rare for a rear spring to break, even on trucks and cars known to be of poor quality. On trucks this may be attributed to the narrowness of the front wheels; these would drop into small holes over which the rear tires would ride safely, thus putting additional stresses on the front. Few, if any, trucks on war service had sufficiently heavy front springs. The generally adopted method of attaching the springs to the axle cannot be considered safe. Not one driver in a hundred thinks it necessary to give any attention to his spring clips, yet these have a habit of working loose, and in many cases when an axle has shifted it is practically impossible to steer the vehicle. Frequently the complete breakage of a front spring is to be preferred to the loss of nuts or the breakage of clips.

Radiators were a general source of trouble, many a good engine being burned out by reason of small-diameter tubes or by brackish water. The honeycomb radiator is not suitable for army truck service. The large-diameter vertical tube type is most successful, and is adopted whenever replacements become necessary. Another good type is the circular tube radiator with centrifugal fan, as used on the Paris omnibus type of chassis.

Considering a 3½-ton truck as the most suitable type, and of this all who have had experience in the war zone are in agreement, the engine should be a four-cylinder L-head of about 450 cubic inches piston displacement. It has already been stated that the under-the-seat position is not suitable except for special service where a maximum body space is required. The underpan is an abomination on an army truck. The base-chamber should be easily removable, although unfortunately this does not necessarily follow when there is no mudpan. The connecting rod bearings should be detachable, so that it is possible to change them in case of necessity without taking the engine out of the frame. A speed governor is a desirable equipment.

War service has tended to prove the superiority of pump circulation over thermo-syphon. As a general rule trucks tend to overheat when operating in convoy formation on crowded roads. This condition is common on certain portions of the front, and should be provided for. There are few trucks on which sufficient attention is paid to draining off all the water from radiator, pump, and jackets. No man who has had to start an engine at daybreak on a frosty morning, with the knowledge that delay meant disaster, is inclined to treat this matter lightly. The manufacturer might help in this direction by making a tightly-fitting hood with louvers that could be opened or closed at will, by supplying a heat retaining radiator cover and also providing a safety lamp capable of maintaining a certain amount of heat under the hood when the truck is left standing in the open all night. An adjustable air-shutter on the carburetter is a valuable fitment. It is important, too, that the engine should develop something like its full power within a few minutes of starting. In the early days of the war, before men had learned to take precautions, the writer has known convoys to be held up for three or four hours owing to starting difficulties.

All army trucks should have radiator guards attached, not to the radiator itself, but to the frame members. The design should be such as not to interfere with free operation of the starting crank. The guard, too, should be so designed that it will not allow the overhanging rear of the body to pass above it. In some cases it has been found advisable to fit a transverse bumper with coil springs at the rear of the trucks, this bumper coming in contact with the centre of the radiator guard in case of a collision.

Lubrication, Turning Radius, and Gear Boxes, Etc.

It has been noticed by officers in charge of army repair depots that engines with the old-fashioned splash system of lubrication are generally better preserved than those with pressure feed of oil to all bearings. On war service the lubricating oil is apt to remain in service longer than is desirable, and the impurities deposited in the oil are picked up by the pump and forced into the bearings. The remedy seems to be, not a return to splash, but a pressure or circulating system so designed that the dirt will deposit away from the pump. It is not necessary that the pump should be in the lowest portion of the base-chamber. Several American trucks have suffered materially and in reputation by the absence of a suitable oil. Pressure feed being common in Europe, a heavy oil is generally employed, and this has been used with disastrous results in engines requiring a light-bodied oil. The only remedy appears to be for manufacturers to indicate clearly the type of oil to be used in their engines. The best place for the fuel tank is on the dash. Suitable provision has not been made, particularly on French and American trucks, for the carrying of a reserve supply of fuel. Thus drivers have had to fix up as best they can a storage place for a 12-gallon can of gasoline. Ignition by high-tension magneto has proved all that could be desired for war service, no need having been shown for a second system, either as a reserve or for ease in starting.

There is an amazing lack of uniformity in the steering lock and the turning radius of army trucks. This is most disadvantageous when convoys are composed of different makes of trucks, for while one vehicle can make a turn easily the one following may be unable so do so. The disadvantage is also felt where makes are grouped, for one convoy may negotiate a difficult road with ease while the next will be stopped. In some makes of trucks the short turning radius is only an illusion, for owing to the radiator extension in front of the axle it is only possible to turn within the given radius if the road is entirely free. In other cases the radiator is so high that it is impossible for the driver to see directly ahead and take full advantage of his lock. This matter is important, for when a road is under fire the greater the time spent in making a turn the greater the chance of being hit by a shell.

Brake rods should be regarded as organs needing protection and placed in such a position that they are not likely to be damaged by obstacles on the road. Not many American trucks are fitted with sprags, although this is a valuable accessory on military trucks working in convoy formation.

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MOTOR TRAFFIC.

Four-speed gear boxes are now insisted on by the French military authorities, and are found to be indispensable. First speed should be equivalent to 2 miles per hour, with the engine running at its normal speed, 1,000 to 1,200 revolutions per minute. One type of gear box that has proved satisfactory under war service is the Damaizin patent constant mesh gears. This gear set was fitted to the Paris omnibus chassis, and its use has been extended to other makes. It is impossible for a driver to muddle his gears, no matter how ignorant he may be of the elementary methods of changing. No experiments have been made with trucks without differentials, but a differential lock, capable of being operated from the driver's seat if possible is an absolute necessity under many conditions of active service. The only reproach brought against one of the best American trucks on the French front is the absence of this lock.

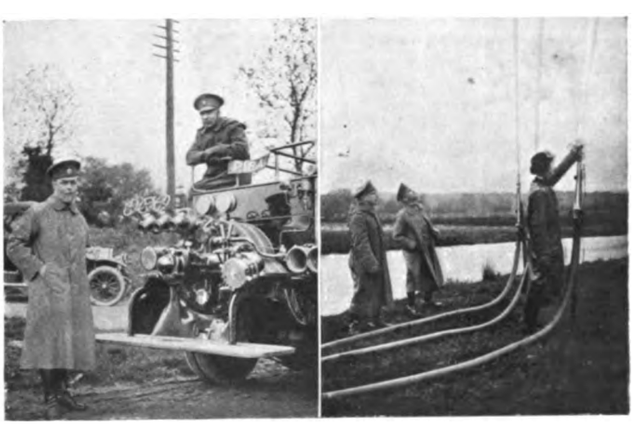
ECONOMY OF MOTOR FIRE APPLIANCES.

From time to time as the London Fire Brigade have made progress in the motorisation of their engines, escapes, and turntable ladders, the Chief Officer has been able to recommend either a reduction in the number of men by dispensing with the services of coachmen, or else an increase in the effective strength by substituting firemen for coachmen. A step of the latter character was taken by the County Council on July 18, when it was decided to dispense with 16 horse drivers and to add 16 firemen.

On the same occasion the Council approved of the action of the Fire Brigade Committee in having accepted the offer of Leyland Motors (1914) Limited to supply two new motor fire engines at £887 each. The committee also reported that they had arranged for a sum of £20 for contingencies in respect of each appliance to be included in the contract. The two engines were required in place of four motor engines that had been disposed of, two at £500 each and two at £400 each. These were purchased in the early stages of the process of substituting motor for horse-drawn appliances, and of late the outlay on repairing and overhauling them had been disproportionately heavy. The committee had been advised that if more efficient appliances were obtained the number of spare engines could be reduced, and that it would be necessary to obtain only two new machines.

DENNIS FIRE ENGINES FOR RUSSIA.

The wide adoption of motor fire extinguishing appliances in this country of late years has added to the sense of security of the population during the visitations by the German barbarians of the air. Notwithstanding the extra busy time that British manufacturers of motor fire engines have experienced since the outbreak of the war, they have found themselves able to provide machines



Capacity Test of a Dennis Fire Engine.

for our Russian and French allies, thanks to the patriotism of their employees in facing work at long continued high pressure. In the production of these appliances the British makers stand unrivalled for the efficiency of the engines and excellence of workmanship. The accompanying photographs illustrate tests of one of two Dennis turbine motor fire engines recently supplied to the Russian Government by Dennis Bros., Limited, of Guildford. These engines from the Guildford works are intended for the protection of the Obouchoff Admiralty Works at Petrograd, and they are very similar in type to numbers now utilised by the London Fire Brigade and other fire brigades in the United Kingdom. The engine undergoing tests in the presence of two Russian officers is of the six-cylinder 500

The Deep Lift Test.

gallons type, but the actual capacity on the official trials showed an appreciable increase on the latter figure, the readings indicating a discharge of over 600 gallons per minute. The photographs show the capacity and the deep lift tests, the latter being taken from a point 26 ft. below the engine level. Running on a level road, the machine attained a speed of nearly 40 miles an hour.

MOTOR VEHICLES FOR MUNICIPALITIES.

Tynemouth Council are obtaining a motor fire engine.

Finsbury Council have ordered a Laffly motor road sweeping machine.

Poplar Council have been recommended to purchase a motor car for the works department.

Hull Tramways Committee have ordered a 3-ton Belsize chassis for a tower wagon at £700.

Friern Barnet Council are considering the question of purchasing a motor fire engine.

Rotherham Gas Committee have obtained the consent of the Corporation to the purchase of a motor lorry.

Salford Council have placed a contract with Mr. T. Garner, Manchester, for supplying four Studebaker motor ambulance vans at £1,150.

South Shields Council have decided to acquire a second Edison battery wagon, at £1,007. An Edison ash-tipping wagon is expected to be delivered shortly.

Bradford Council have decided to purchase three electric tipping wagons, and application has been made to the Local Government Board for permission to borrow £3,700 in payment.

Birmingham Corporation have purchased a British-made car for the use of the stable and veterinary department. Two electric wagons for the collection of house refuse have been put in service.

Salford Council have sanctioned the purchase of four motor ambulances for the conveyance of wounded soldiers to and from hospitals. The vehicles have been presented to the Red Cross Society. As the result of the Council's action, thirteen ambulances have been presented by other local institutions.

New Works for Leyland Motors, Limited. This company purpose erecting additional works at Farington, instead of on land adjoining the present works at Leyland. This will enable a railway siding to be provided for the use of the company and the Leyland and Birmingham Rubber Company.

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MOTOR TRAFFIC.

NEW OMNIBUS ROUTES.

ATTITUDE OF THE LOCAL AUTHORITIES.

In connection with the institution during the present year of the London General Omnibus Company's service from Woolwich to Erith, the Road Board have asked Woolwich Council to maintain the roads involved in a suitable condition. The Board will then make representations to the Ministry of Munitions for a refund of any expenditure in excess of the average annual maintenance during the preceding five years. This communication was received by the Council in response to an application to the Board for a grant to cover the cost of resurfacing the macadam roadway, estimated at £3,500. The Ministry of Munitions recently notified the Council of the starting of two new services from Beckenham and Brockley to Woolwich, and the latter body have replied that they have no objection to the use of their roads, subject to the Road Board agreeing to reimburse them any extra cost of maintenance.

The County Councils' Association have adopted a recommendation by their Highways Committee framing a general policy for county councils in regard to new omnibus routes. They recommend that maps be prepared showing new routes of traffic and roads capable of carrying omnibus traffic, and that, as far as possible, the councils should get the owners of the vehicles to co-operate by friendly arrangement as to the routes to be used.

In connection with the Local Government (Emergency Provisions) Act, 1916, which makes it unlawful for any omnibus to ply for hire on any route that has not been regularly used by omnibuses plying for hire within two years prior to March 1, 1916, except with the consent of the highway authority, the Highways Committee of the London County Council have been entrusted with the consideration of matters arising under the Act so far as they affect the position of the Council as highway authority.

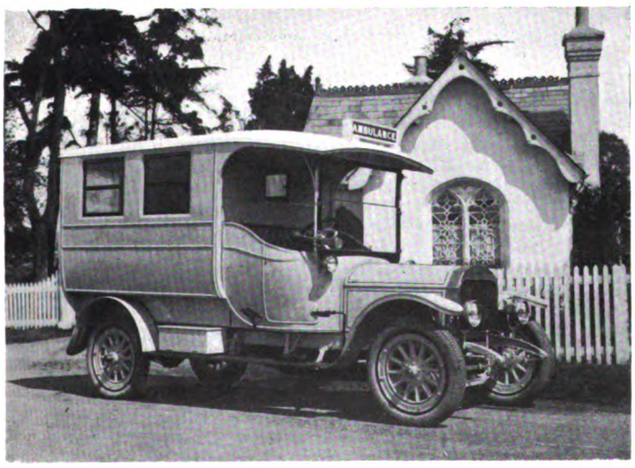
The Scottish General Transport Company having asked for sanction to the provision of omnibus services between Stirling, Dollar, Loncroft, and Alloa, the Stirlingshire Central District Committee have decided to approve of the application if the company will pay "a charge of ½d. per ton-mile for 12 months, at the end of which time the matter will be reconsidered."

Two Glasgow firms of motor hirers have applied to the Western District Committee of the County Council for permission to run omnibuses between Glasgow and Aberfoyle. It was stated that the Central District Committee imposed a charge of ½d. per ton-mile, and the application was referred to the Roads Committee.

Eastbourne Corporation have prohibited the use of certain roads for the return journeys of chars-a-bancs from Seaford and Brighton. Three licences have been granted to a rival company, subject to the vehicles not entering the borough by certain roads. These restrictions have thrown extra traffic on roads under the control of Eastbourne Rural Council, who have asked the advice of the Local Government Board in regard to dealing with such users of district roads.

DENNIS AMBULANCE FOR BLACKPOOL

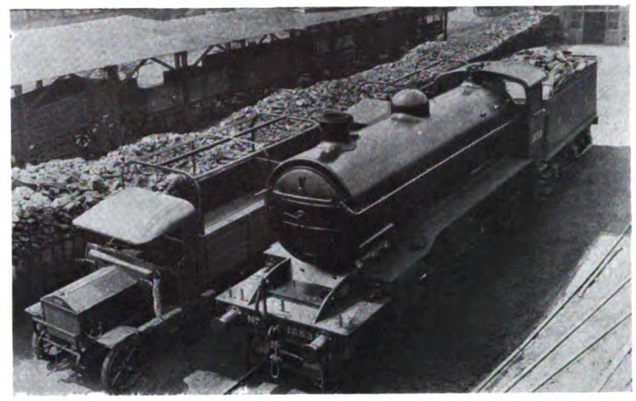
The Dennis ambulance here illustrated was presented by the Blackpool Traders' Association to the local hospital. The vehicle



is of 24 H.P. standard London County Council type, having a four-cylinder engine and four-speed gear box. The cantilever springing ensures easy riding. Accommodation is provided for four persons—two outside and two inside—in addition to the driver.

AN ALLY OF THE RAILWAY.

During the war the motor lorry has proved invaluable to railway companies and traders in enabling goods trains to be rapidly unloaded as well as by providing an alternative means of transport. The subjoined photograph taken from a semi-bird's eye position, shows one of the latest type Great Northern Railway express goods engines (which is Mr. Gresley's last word in this Atlantic type of engine), taken alongside two Napier 3½-ton motor vehicles. In the old days it was customary to regard the motor transport wagon as a competitor to the great railway companies, but time has proved that the former have been the means of bringing greatly increased traffic to the railways. The two models shown are two of the well-known



3½-ton Napiers, which are actively engaged on Government work for the Allies.

The railway companies of the United Kingdom last year owned 223 motor omnibuses and more than 250 motor lorries and vans, notwithstanding the extensive requisitioning of vehicles by the War Office during the year 1914. Since then the deficiencies have been made good by the purchase of petrol and electric battery vehicles. The largest fleets are owned by the Great Western with 109 omnibuses and 95 lorries and vans. The London and North Western have 20 omnibuses and 75 lorries and vans, the figures for the other leading companies being :—North Eastern, 43 and 17 ; Midland, 2 and 38 ; Great North of Scotland, 36 ; London and South Western, 2 and 27.

MOTOR DRIVERS' EXAMINATIONS.

The results of the annual written technical examination of commercial motor drivers held by the Commercial Motor Users' Association have been announced as subjoined:—

PETROL EXAMINATION.—Champion Petrol Driver—First prize of £5, certificate and badge :—W. G. Hayter (employer, Roburite and Ammonal, Limited) ; equal second—£3, certificate and badge :—J. B. Pudney (Hawkes Brothers, Limited) and R. J. W. Spurrier (E. Nelson and Company) ; £2 and certificate :—C. F. Bidmead (Westminster Electric Supply) ; £1 each and certificate :—A. J. Woodcock (E. Nelson and Company), A. Kiff (Tottenham District Gas Company), G. A. Cooper (General Post Office), R. W. Shepard (Lever Brothers, Limited), G. C. Rochester (Gas light and Coke Company), J. Grove (E. Nelson and Company), J. J. Robins (H. Gadsdon and Son), H. F. Hatch (General Post Office), J. J. Pearcy (McNamara and Company, Limited), C. H. Dench (Bryant and May, Limited), and E. Small (General Post Office).

STEAM EXAMINATION.—Champion Steam Driver—First prize of £5, certificate, and badge :—F. Upchurch (employer, Sun Flour Mills Company, Limited) ; equal second—£3, certificate, and badge :—H. J. Maskell (M. B. Foster & Sons) and H. Button (Higgs and Hill, Limited) ; £2 and certificate :—J. Copsey (Gas Light and Coke Company) ; £1 each and certificate :—F. Coughtrey (Westminster City Council) and J. Donoghue (Westminster City Council).

ELECTRIC EXAMINATION.—First prize of £5 and certificate :—A. Kiff (Tottenham District Gas Company) ; £3 and certificate :—J. Grove (E. Nelson and Company).

Mr. G. W. Watson, the examiner, reports that the work done by the candidates showed a standard of intelligence higher than ever before. The prizes fund was contributed to by many well-known firms.

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MOTOR TRAFFIC.

BLACKPOOL'S MUNICIPAL MOTOR VEHICLES.

Fire Extinction and Street Cleansing.

On the occasion of the forty-second annual meeting of the Institution of Municipal and County Engineers, which was held at Blackpool from June 29 to July 1, Mr. J. S. Brodie, the president, borough engineer of Blackpool, included in his address the following descriptions of the motor fire engine and street cleansing vehicles in use in Blackpool.

Leyland Motor Fire Engine and Pump.

Of this vehicle, which was purchased in 1913 at a cost of £1,115, the subjoined particulars were furnished by the Chief Constable, Mr. W. J. Pringle. The engine is of the 4-cylinder vertical type, with dual ignition, and capable of developing 60 H.P. on the bench at 1,020 revolutions per minute. Its consumption of petrol is comparatively small, being on an average of seven gallons for one hour's pumping and 12 miles to one gallon on the road, and it is practically smokeless. Forty-five miles per hour can be obtained on the level, and gradients of 1—6½ can be negotiated with full load. There are fitted four speeds forward and one reverse. The drive is transmitted from the engine to the gear box, thence through a universal joint to the differential casing, the final reduction being made through a crown wheel and two spur wheels, and direct on to two spur wheels fixed on the axle, which is of the War Office type, its great advantage being that the weight of the machine is removed from the axle to the axle casing. The control is by means of ignition and throttle levers which are fitted on a quadrant immediately under the steering wheel, and foot accelerator which acts on the throttle and controls the more rapid though necessarily less fine adjustments called for in traffic. Dual ignition is fitted in Bosch watertight magneto and Wade and Jones distributor and coil, and the engine will start readily from either. The carburetter is of the Zenith type, automatic, giving correct mixtures at all speeds. The petrol tank is of steel, lead coated, and has a capacity of 30 gallons which will allow of four hours' continuous pumping. The water-cooling and oil lubrication are automatic. Cooling is ensured when working the pump for a considerable time by means of a special two-way valve fitted to the turbine pump casing, whereby water is supplied under pressure to one of two filters, from which it passes into the engine circulation.

When pumping sea water, fresh water is required for cooling, and this may be supplied to the engine circulation from a hydrant, an adaptor being fitted under the radiator for this purpose. The steering is of the worm and segment type. Two double acting brakes are fitted, one on the gear shaft, which is of ample width and actuated by a push foot pedal, and one operating on the road wheels of the internal expanding type and operated by a hand lever. The tires are of the K.T. type, and specially designed to prevent side slipping. The pump is made of gun-metal throughout, and is of the Rees Roturbo type, twin impellor, four stage, is capable of delivering 450 gallons per minute at a pressure of 120 lbs. to the sq. in. in the pump when working with a suction lift of 10 feet. It will also deliver water through 100 feet of 2½ in. rubber-lined hose and 1⅛ in. jet with 120 lbs. on the pump gauge. It will also deliver water through the same hose and 1¼ in. jet at 160 lbs. on the pump gauge, and maintain this pressure for four hours. The great advantage when working the pump is the general accessibility to the controlling parts, which are confined to the rear of the machine. This avoids any running backwards and forwards from the engine to the pump by the man in charge.

A first aid apparatus is fitted—this consists of a lead-lined steel tank of 40 gallons capacity, fitted with the necessary control valves, hose reel, with 180 feet of 1 in. four-ply rubber hose, ¼ in. jet, and will perform the following operations:—(*a*) supply water from tank to pump; (*b*) supply water from tank or hydrant to hose; (*c*) supply from hydrant to tank; (*d*) supply from the pump to the hose. A pressure of 60 lbs. can be obtained, and an efficient fire stream maintained for the extinguishing of small fires. The operation is by running the turbine pump slowly. A large hose box is fitted which is capable of carrying 2,000 feet of 2½ in. hose and sundry fire appliances, and will seat eight or nine men. There are also fitted side boxes for branch pipes, standpipes, jets, tools, smoke helmet apparatus boxes, etc. A 40 feet Ajax telescopic ladder built in three sections is mounted on suitable brackets, and fittings are also provided to attach if necessary the existing 60 ft. escape.

Laffly Motor Sweeping Machine.

Mr. James Bee, cleansing superintendent, Blackpool, supplied the appended details concerning the Laffly motor sweeper which was purchased in June, 1914, at a cost of £628. This machine has in every respect given entire satisfaction, and has been the means of effecting a very considerable saving in the cost of street cleansing, although, owing to the comparatively little use of horse machine brooms in recent years, it is difficult to say definitely what the actual saving has been, but it is estimated that the motor is quite capable of carrying out the work of six horse machine brooms. The machine is able to sweep at the rate of eight miles per hour, and under ordinary working conditions it sweeps the Promenade from North Pier to Manchester Hotel (a distance of about a mile long by 15 yards wide) in 40 minutes. The broom, which lasts about 60 hours, and costs £1 18s. to re-bass, sweeps a span of 6 ft. wide; whilst a forced spray operates in front of the broom when necessary. It is not practicable to use the machine to its full capacity, as a considerable number of Blackpool streets are constructed of macadam, and it is not advisable to sweep this class of road too frequently with a machine broom. For the purpose of washing the streets, the motor broom has proved invaluable, as, together with the electric sprinkler, this work is now carried out far more efficiently and expeditiously than was the case when it was necessary to employ horse-drawn watering-carts and machine brooms.

Working expenses of the motor sweeping machine since June, 1914:—

	1914-15. (10 months.)	1915-16.
Driver's wages:—	£ s. d.	£ s. d.
Sweeping streets	22 0 5	24 2 1
Washing streets	1 17 7	2 13 8
Cleaning motor, etc.	15 11 9	11 11 7
	39 9 9	38 7 4
Working expenses:—		
Petrol	36 1 6	41 8 0
Oil and grease	3 5 11	1 8 4
Re-bassing brooms	21 4 0	24 0 0
Repairs	4 7 6	17 9 7
Insurance	7 13 0	8 14 9
Depreciation on machine	—	62 16 0
Depreciation on tires	—	20 0 0
	£112 1 8	£214 4 0

	1914-15. (10 months.)	1915-16.
Gallons of petrol consumed	520	576
Hours at work:—		
Sweeping streets	755	826½
Washing streets	64½	92
	819½	918½
Days at work	236	265
Petrol used per hour	2¼ qts.	2½ qts.
Cost per hour:—		
Driver's wages	7d.	7d.
Petrol	10d.	11d.
Repairs, etc.	1s. 4d.	1s. 4d.
Depreciation	—	1s. 10d.
	2s. 9d.	4s. 8d.

Electric Street Watering Vehicle.

Mr. Bee also gave the following information respecting the above vehicle, which was supplied by the General Vehicle Company, Limited, of London, in July, 1915, and cost £974. The chassis is a 3½ tons one, and is 18 ft. 6 in. long and 6 ft. 9 in. wide. The total weight of the vehicle when empty is 5 tons; but when full its weight is increased to about 8 tons 10 cwt. The wheels are fitted with solid rubber tires, the front ones being single and the back ones twin; and they are chain driven. The tank, which is cylindrical in shape, has a capacity of 750 gallons, and is fitted with sleeve valve sprinklers, the spray being at front for easier control by the driver. The battery for supplying the motive power is an Ironclad Exide, and consists of 44 cells. These are re-charged from the refuse destructor electric plant at a charge of one penny per unit; this is an important factor, and a convincing argument in favour of electric vehicles for carrying out municipal work. The re-charging of the batteries takes about six hours, and is carried out during the night. A boosting charge is made during the dinner hour. The current used in charging at 5 amp. hours per unit is approximately 70 units. During an average day of nine hours the vehicle waters about 40 miles of streets, using about 22 loads, which is equal to 16,500 gallons of water. The ampère hours used during this period amounts to about 300, or 7½ ampère hours per mile. The vehicle is capable of travelling 40 miles at one charging, and on a level road can travel at 10 miles per hour.

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MOTOR TRAFFIC.

Although only obtained at the end of last July, the work which the vehicle has accomplished since then shows that it will prove a great saving to the department, and will easily do the work of six horse-drawn watering vans. In connection with the washing of the promenade during the end of last summer, the use of the vehicle released four men for other work. The usefulness of the vehicle is not limited to the watering of streets, as it is also used in conjunction with the motor sweeping machine for washing streets. As they are able to travel at a fair speed, only half the water is used compared with horse-drawn vans; whilst the work is done better and quicker. In addition to this the electric vehicle has already accomplished good work in connection with the cleansing of sewers, as with a flush of 750 gallons the trouble and expense of dredging operations, which are both slow and costly, are often saved. In conclusion, it is interesting to note that the electric street watering vehicle was the first of its kind to be used in this country, and many enquiries have been made respecting it.

The following are particulars of the cost, and work carried out by the vehicle, during the eight months it has been at work :—

To March, 31, 1916.

WORKING EXPENDITURE.

	Hours.	£ s. d.
Driver's wages :—		
Watering streets	475 ...	13 16 1
Washing streets	92½ ...	2 13 11
Flushing sewers	64½ ...	1 17 7
Cleaning, etc.	111½ ...	3 5 0
		21 12 7
Re-charging batteries, 4,261 units at 1d.	... ...	17 15 1
Insurance	... ...	10 19 9
Depreciation (8 months) :—		
Vehicle (tank, etc.)	46 0 0	
Batteries	30 0 0	
Tires	7 0 0	
		83 0 0
Sundries (oil, grease, etc.)	... ...	2 0 0
		£135 7 5
Miles vehicle travelled	... ...	2,566
Miles watered	... ...	1,713
Gallons of salt water used :—		
Watering streets	556,550	
Washing streets	174,850	
Flushing sewers	81,250	
		812,650
Days at work watering streets	... ...	59
Total days at work	... ...	97

Additional information relating to this vehicle was given by Mr. Bee in a paper read at the conference of the Institute of Cleansing Superintendents held at Cardiff on July 17-21. The author then observed that as the vehicle is called upon to move a great weight during the course of the day, and is loaded up many times, he had never run it more than about 30 miles without it being boosted up. Mr. Bee gave the following additional figures of the working costs for April and May, 1916 (the cost of power being worked out on the basis of 1½ units per mile), as compared with horse vehicles :—

COST OF STREET WATERING FOR APRIL AND MAY, 1916.

1916.	£ s. d.	£ s. d.
Wages—		
Motor driver	8 7 4	
Horse drivers	10 3 0	
Hire of horses from Highway Department	10 5 10	
Depreciation—		
Vehicle £12		
Batteries 8		
Tires 4		
	24 0 0	
Sundries—Insurance, oil, etc....	2 10 0	
Power—1,902 units at 1d.	7 18 6	
Water	16 3 0	
		79 7 8
1915.		
Wages—Horse drivers	58 12 8	
Hire of horses from Highway Department	60 9 0	
Hired carts (horses and drivers)	19 10 5	
Water	36 2 9	
		174 14 10

Total saving on the two months, £95 7s. 2d.

In the author's opinion the electric vehicle is quite capable of doing the work of six horse vans, and as it might be of interest to the members, I have estimated what the saving would be per week (5½ days), on this basis.

COST OF ELECTRIC VEHICLE PER WEEK.

	£ s. d.	£ s. d.
Driver's wages	1 15 0	
Power, 384 units at 1d.	1 12 0	
Depreciation	2 10 0	
Sundries, insurance, oil, etc.	0 6 0	
Water, 84,500 gallons	2 2 3	
		8 5 3

COST OF SIX WATERING VANS PER WEEK.

	£ s. d.	£ s. d.
Six drivers' wages at 29s.	8 14 0	
Hire of six horses at 27s.	8 2 0	
Water, 173,000 gallons	4 6 3	
		21 2 3

Estimated saving per week, £12 17s.

The present vehicle had given such entire satisfaction that the Cleansing Committee had ordered the same firm to supply a similar vehicle at a cost of £1,028.

REFUSE REMOVAL BY ELECTRIC WAGONS.

At the recent Cardiff conference of the Institute of Cleansing Superintendents, Mr. J. Terry, of Nottingham, gave his experiences in the use of two Edison accumulator wagons, and presented the following statistical information :—

During six months ending July 1, 1915, the cost of emptying dry ash-bins by horse vehicles in Nottingham averaged 4s. 4d. per ton, but, owing to the increased charges for horse-keep, wages, etc., the cost is now 5s. Our No. 1 motor was delivered on October 15, 1915, commenced work on the 18th, and has been in use daily ever since. During the six months ending April 15 it carried 422 loads, weighing 1,288 tons, at a cost of £241 13s. 10d., which is equal to 3s. 9d. per ton, the average weight per load being 3·05 tons. The costs are made up as follows :—

	£ s. d.
Depreciation at 10 per cent.	£52 13 0
Insurance	4 5 0
Oil, water, repairs, etc. (allowed)	11 9 8
Tires—1,819 miles at 1·1d.	8 6 9
Current—2,541 units at 1¼d.	13 4 8
Wages...	151 14 9
	£241 13 10

If we take the six months ending July 1, 1916, we get a period corresponding to the period covered by the figures given in my original report, and this is a more fair comparison than taking the first six months' work, which are all winter months. We find that during this time we removed 1,167 tons of refuse at a cost of £253, or 4s. 4d. per ton, which is exactly the same as the cost by horses as mentioned in my original report, but it must be remembered that the conditions then were the same as before the war. Under existing conditions, as I have already stated, the cost is 5s., thus showing 8d. per ton in favour of the motor, which means that if all our dry ash refuse were removed by motors, a saving of over £1,000 per annum would be effected, and this in a town which I consider not best adapted to motor traction for this class of work. I have dealt only with the results obtained by our No. 1 motor, but the figures for the No. 2, which has been at work daily since March 13, are identical.

Even if the running costs and standing charges of motor vehicles are only equivalent to the present cost of horse collection, I most strongly contend that, from a sanitary point of view, the change is to be recommended. I feel personally that too much emphasis cannot be brought to bear on what appears of national importance, for the following, amongst many other reasons, which no doubt will occur to you :—(1) Cleanliness of street; (2) labour provided for building chassis in this country; (3) reducing the demand for fodder and cereals for horses; and (4) correspondingly increasing the supply available for feeding cattle. From a hygienic standpoint the value of No. 1 alone compels us, as cleansing superintendents, to be in the front rank in adopting this improved form of traction.

It is worthy of mention that my faith in the success of electrics is upheld by many other municipal officials who, with myself, have franked their good opinion by placing orders and repeat orders, as follows :—Edison battery vehicles—Sheffield, 5; Chester, 4; Dover, 6; Barnes, 4; Glasgow, 2; Pontypridd, 2; Newcastle, Heston and Isleworth, South Shields and Smethwick, 1 each. Lead batteries—Birmingham, 2; Wolverhampton, 1. In many cases reports have been made, in each of which substantial savings have been shown.

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MOTOR TRAFFIC.

EDISON WAGON AT SOUTHAMPTON.

The 2-ton chassis Edison tip wagon illustrated below was purchased some time ago by Southampton Corporation Tramways on the advice of Mr. W. Robson, general manager and engineer. The chassis is of the ordinary GM 2-ton type, with a battery equipment

of 60 A8 Edison cells. This vehicle and a tower wagon, which has a similar chassis and was illustrated in our issue of March 12, 1914, have replaced five horses, and although it is too early to give exact figures, it is already evident that a considerable financial saving will result.

MOTOR TRAFFIC NOTES.

A New Service in Cheshire.—The British Automobile Traction Company have been granted licences to run four motor omnibuses in Altrincham.

Wolverhampton Corporation Omnibuses.—The motor chars-a-bancs department of the Corporation tramways yielded a gross profit of £1,459 for the year ended March 31 last.

St. Helens and District Motor Services.—The Daimler Company had supplied an eighth chassis to this company, and it has been fitted with a single-deck omnibus body by Messrs. E. and H. Hora, London.

Birmingham Corporation Omnibuses.—The Daimler Company have completed the order received for twelve new omnibuses for Birmingham Corporation Tramways. The department are now running fifty vehicles on the various city routes.

Electric Traction in the Future.—Middlesbrough Council have appointed a sub-committee to consider the question of taking over the local tramways. Ald. Hinton said the committee would have to consider the possible variation in the distribution of coal after the war and the substitution of benzol and petrol, which might revolutionise the question of street traction.

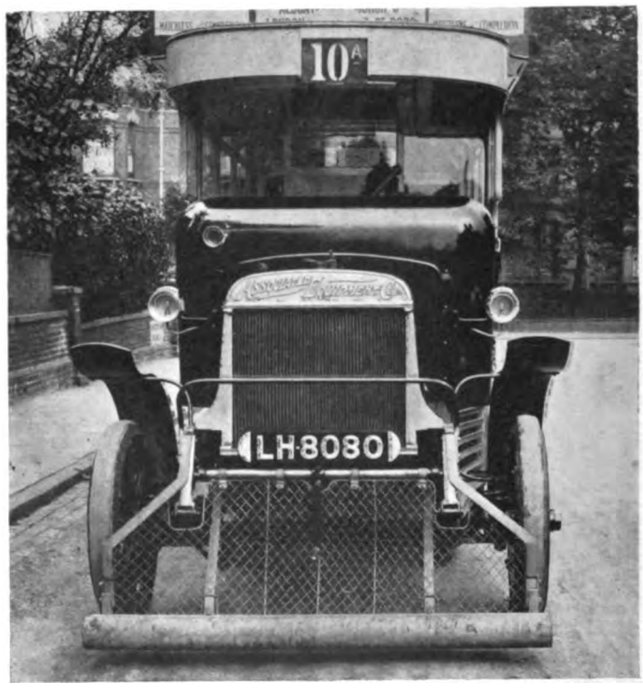
Omnibuses for Wounded Soldiers.—On the occasion of the meeting at the Royal Albert Hall on August 4, to mark the opening of the third year of the war, the London General Omnibus Company lent 150 omnibuses to convey to the hall 3,500 soldiers from the hospitals in the vicinity of the metropolis. The petrol consumed was a gift from the Asiatic Petroleum Company.

Omnibus Service Suggested for Musselburgh.—That the Town Council should invite the Edinburgh motor omnibuses to run between Joppa and Prestonpans was a suggestion submitted by Councillor Niven at the last meeting. The Town Clerk, while not prepared to state whether the Corporation had power to give an invitation, said the Tramways Company had statutory powers, and might possibly object to opposition running over their track.

Albion Company's Enterprise.—This commercial motor vehicle firm, whose works are at Scotstoun, Glasgow, have issued a booklet that should prove of assistance to municipalities, traction undertakings, and business firms who desire to be in a position to secure early delivery of machines after the war. The company advise intending purchasers not to postpone the consideration of the question until the close of the conflict, when it may be difficult to secure a reliable vehicle at short notice, but to at once consult them. If any commendation of the products of the Albion Works is needed it is to be found in convincing form in the booklet, which gives particulars and illustrations of Albions that have been in service for periods ranging from 9½ years to 14 years. Unfortunately for the commercial motor manufacturing business, there have been a number of motors placed on the market the design of which originally was intended for pleasure car work. To meet the urgent demands of the business community, the chassis have been slightly modified and offered freely as commercial motors. The user of such vehicles generally finds within a year or two his motor van is completely broken down, and the repairs required necessitate a complete withdrawal of the vehicle from service.

LIFEGUARD FOR OMNIBUSES.

The photograph reproduced below gives a very clear indication of the front wheel lifeguard with which the London General Omnibus Company is now experimenting. This type is intended to pick up the person who has the misfortune to fall in front of the vehicle or to be knocked down thereby. The lower portion of the guard is composed of india-rubber. The company has had something like 900 different designs submitted, but in nearly every instance



Experimental Lifeguard on a London Omnibus.

the suggested device was obviously impracticable. The sideguard, which was introduced about three years ago, has proved very efficient. Its object is not to pick up any obstacle lying in the track of the omnibus, but to push it aside and prevent it from getting under the rear wheels. It was from rear wheel accidents that the majority of fatalities previously arose. The effectiveness of the sideguard is shown by the operating manager's (Mr. H. E. Blain) recent announcement that it has saved 123 lives.

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."

Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

VICTORIAN STATE RAILWAYS.

The Agent-General for Victoria, Australia, invites tenders for the Supply and Delivery F.O.B. London of:—

Contract No. L8.

144 Copper tubes for steam pressure gauges.
50 Copper tubes for duplex air pressure gauges.

Particulars of requirements may be obtained and samples may be viewed at the offices of the Consulting Engineers—John Coates and Co., Ltd., 115, Victoria Street, London, S.W.

Tenders are to be returned to the Agent-General for Victoria, Melbourne Place, Strand, London, W.C., marked "Tender for Contract L8," not later than 11 a.m. on Wednesday, August 23.

The lowest or any tender not necessarily accepted.

(Signed) PETER McBRIDE,
Agent-General for Victoria.

POSITIONS VACANT.

COUNTY BOROUGH OF WEST HAM.

TRAMWAYS MANAGER.

The Council require the services of a Manager for their Electric Tramways System, to undertake the general control of the working of the tramways, including the management of all matters connected with the undertaking except the supply of current up to the feeder pillars.

Salary £600 per annum, rising, on satisfactory service, by increments of £50 per annum, to £750.

Application forms will be forwarded on receipt of addressed foolscap envelope. Canvassing is strictly prohibited.

Applications, on the official forms, must reach me not later than 10 a.m. on Thursday, August 31, 1916.

GEORGE E. HILLEARY,
Town Clerk.

Town Hall, West Ham.
August 11, 1916.

COUNTY BOROUGH OF HALIFAX.

BOROUGH ENGINEER'S DEPARTMENT.

TEMPORARY ASSISTANTS.

Applications are invited for the appointment of two Temporary Assistants, one Engineering and the other Architectural. The appointments will be for the period of the war, and salaries at the rate of £150 per annum.

Applications, in candidates' own handwriting, accompanied by not more than three testimonials, to be sent to the undersigned not later than August 21, 1916.

JAMES LORD,
Borough Engineer.

Town Hall, Halifax.
August 8, 1916.

CORPORATION OF WAKEFIELD ELECTRICITY DEPARTMENT.

Charge Engineer wanted for the above power station to take charge of a shift with polyphase H.T. plant, high-speed engines and turbines.

Previous experience in similar position essential.

Salary to commence £2 per week, rising to £2 2s. if satisfactory.

Applications in writing, with copies of not more than three recent testimonials, and giving age and full details of experience, to be addressed to the CITY ELECTRICAL ENGINEER, Old Town Hall, Wakefield.

NEATH RURAL DISTRICT COUNCIL.

SHIFT ENGINEER.

Required immediately, Shift Engineer, used to A.C. work. Wages commencing, 35s. per week and war bonus.

Apply, with testimonials, stating age and experience, and when duties could be commenced, not later than August 18, 1916, to

G. H. THOMSON,
Electrical Engineer and Manager.

8, New Street, Neath.

ARMATURE WINDER.

Wanted, first-class man for Tramway Depôt. Permanency if suitable. Apply, GENERAL MANAGER, Rotherham Corporation Tramways, Rawmarsh Road, Rotherham.

SMART TRAFFIC INSPECTOR.

Must be used to controlling traffic and arranging running, also ineligible for military service. State age, whether married, past experience, and enclose copy of references, with photo, to Maidstone and District Motor Services, Ltd., Maidstone.

ADMIRABLE SITES FOR WORKS, FACTORIES, ETC.

The Great Central Railway passes from the Metropolis northwards through the centre of industrial England, throwing out its branches eastward and westward to the coast. Its lines run over the great coalfield which extends into the counties of Yorkshire, Nottinghamshire, Derbyshire, and Lincolnshire, thus affording an easily accessible source of fuel supply.

This coalfield is the largest in the British Isles, and was estimated by the Royal Commission on Coal Supplies (1905) to cover not only an area of approximately 4,066 square miles, but also to contain not less than forty-nine thousand million (49,000,000,000) tons of Coal. The Lancashire and North Wales Coalfields are also traversed by the Company's lines.

The new eastern port of Immingham should particularly attract traders, as its modern equipment and accessibility at any time of the day or night, irrespective of tides, are important time and labour saving factors.

Adjoining the Great Central railroad at various parts of the system are situated Valuable Sites for Works, where, by the introduction of siding accommodation, goods can pass right into and directly out of the works, which greatly assists the manufacturer to attain his desired position in the world's markets.

For information please communicate with the G.C.R. Publicity Office, 216, Marylebone Road, London, N.W.

Owners and agents of land and buildings for sale or to be let near the Great Central Railway are requested to send particulars to the G.C. Estate Office, 12, Paton Street, Piccadilly, Manchester.

SAM FAY, General Manager.

WANTED FOR BINDING, one copy of THE TRAMWAY AND RAILWAY WORLD, No. 30 (December 11, 1915), Volume 38. Reply to G. E. STECHERT & Co., 2, Star Yard, Carey Street, London, W.C.

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NEWCASTLE-ON-TYNE.

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THE
Tramway AND Railway World

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SATURDAY, AUGUST 12, 1916.

THE MUNICIPAL CONFERENCE.

The value of the tramways associations has never been so clearly demonstrated as has been the case during the war. Apart from the business transacted at the annual conferences the Councils have given much attention to numerous difficulties in regard to materials and labour arising as a result of the conflict, and their work has been of great benefit to all tramway undertakings. Then, at last year's meeting of the Municipal Tramways Association attention was concentrated on two subjects of urgent importance. As many undertakings had yet to adopt the innovation of employing women as conductors, Mr. Dalrymple's paper setting forth the favourable experience of Glasgow in that respect was very valuable. The discussion showed that many managers were agreed in supporting the conclusions arrived at by the Glasgow management, and the paper produced a practical outcome in a twofold sense. For one thing, there could not be any doubt in the minds of representatives of committees and of managers as to the wisdom of employing women if tramways were to be carried on in the face of the further depletion of staff that was to come. The other result led to the opening of the door to the employment of women in London, where on tramcars and omnibuses they now number nearly three thousand. It was at the request of the representatives of municipal tramways in the metropolitan area that the Council undertook to make representations to the Home Secretary against the short-sighted action of the police in refusing to license women conductors, following a period of what can be described as nothing less than persecution of tramways that were doing their best to carry on with male labour. The successful work of the women has been as much a revelation to managers as to the men responsible for the conduct of the police department, which long ago ceased to keep pace with traffic requirements. At the 1915 conference some doubt was expressed whether during the rush hours women should be put in charge of bogie cars carrying the lower deck load of standing passengers permitted during the war in addition to having every seat occupied. What they had then been doing for months in the provinces the women have since repeated in London, many of them proving more expeditious than men. The other matter dealt with last year was the question of increased fares as a means of meeting the higher charges entailed by the war. The financial results at Birmingham have proved the wisdom of the course taken in that city; other undertakings, where some of the fares had been too liberally reduced, have since raised their charges. Equally practical subjects are to be discussed at next month's conference. At a time when goods transport on the roads as well as railways is a matter of increasing difficulty it is regrettable that advantage cannot be taken of the facilities which tramways could be made to offer, especially at night. The paper on the subject, to be submitted by the general managers of the Salford and the Bury tramways, will furnish an opportunity for a discussion of a topic upon the increasing urgency of which all are agreed. The authors have the advantage of being in the midst of the district where there is the greatest call for such use of tramways, and where the subject has previously been considered at a meeting of Lancashire tramways managers. On one occasion the joint use of motor traction and tramways was advocated, and since then it has been shown at Bradford that very effective use can be made of a combination of the railless trolley car and a tramway. Mr. J. M. McElroy's promised paper, entitled "Some notes on passenger transportation in large cities," will be the more interesting because of the experience that the Manchester and other managers have had of conveying overloads during the war, while Mr. McElroy has also a wide range of information gained during his tour. The subject possesses also special interest owing to the fact that a Manchester traffic congestion committee is sitting, their object being to reconcile conflicting interests and to adjust their schemes in the interest of economy.

ORIGIN AND DEVELOPMENT OF TICKETS.

At the concluding session of the series of operating efficiency meetings of the London Underground Railways and General Omnibus Group for the season 1915-1916, a paper on "Tickets—their Origin, Use and Development" was read by Mr. F. C. Bingham (Passenger Agent's Department), Mr. H. E. Blain, the operating manager, presiding over a good attendance. The paper, which was illustrated by a large number of slides, traced the development that had taken place in the booking of passengers from stage coach days to the present. On stage coaches, a system of booking was in operation that took the form of entries in a book, a waybill with corresponding particulars being given to the guard. These waybills contained the names and addresses and destinations of the passengers. Travellers from intermediate stopping points were only accommodated in the event of the coaches being short of their full complement of passengers. The first reliable information with regard to railway tickets being actually issued was in connection with a line called the Leicester and Swannington Railway, which really formed the nucleus of the present Midland Railway. This line was opened in 1832. Tickets of a metal form were introduced, the size being about one and a half inches in diameter. The first use of card tickets after the pattern of the present day tickets was about 1840, the idea being due to Thomas Edmondson, a Quaker, who was appointed station master of Milton on the Newcastle and Carlisle Railway. The inventor rented his patent at 10s. per mile per annum. Hardly any change in railway tickets has taken place in the eighty years which have elapsed. Details of tickets used on the Underground Railways were given, these being of two kinds, one being known to the printing trade as "pulp" and the other as "ordinary card," the former being the cheaper and thinner production and being used for local bookings. The method of requisition and supply to stations was described, and the author discussed various descriptions of tickets issued, including scheme tickets, workmen's tickets and miscellaneous tickets.

Slides were shown of a number of ticket-issuing machines, including the standard electrical machine, the pull-bar machine and the British electrical automatic machine, the first-named being the one in general use on the Underground. It is constructed to issue any of the ordinary forms of tickets, the principle being that a coin weighs down a balance, causing electrical contact and resulting in

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a slide pushing a ticket forward for delivery. The pull-bar type is constructed on similar lines to the ordinary sweetmeat machine, whilst the British electrical automatic machine prints and delivers a ticket.

The object of the various forms of railway ticket cancels (the name of the ticket nipping arrangement in general use) was:—(1) to reveal whether the tickets were being punched at other than the stations at which they were issued; (2) to prevent the use of tickets for a second journey, and (3) to show in the case of traffic where several interests are involved and tickets are cancelled two or three times on a journey, the route which has been actually traversed, this being the determining factor in the division of receipts. The methods and object of railway ticket-sorting offices were also described, and, amongst other interesting points mentioned, was the fact that the issue of the tickets on the Underground Railways amounted to about 300,000,000 per annum, as against 80,000,000 per annum on the whole of the London and North Western Railway.

On the omnibus side, the issue of omnibus tickets was not introduced by the L.G.O.C. until 1891, prior to which date a passenger paid his fare to the conductor, no voucher or ticket being given. Roll tickets were originally introduced by the London Roadcar Co., and their introduction in 1891 on the L.G.O.C. led to a strike in June of that year, which lasted for about ten days. The roll system was only, however, continued until 1893, when the bell punch system was adopted. The various changes in this type of ticket were described and illustrations shown of the different forms of ticket in use, including two-journey, combined omnibus and rail, and other special tickets.

Various forms of punch were discussed and, in the subsequent discussion, it was pointed out that although many attempts had been made to evolve an apparatus which would print and issue tickets of different denominations on some simple method, this had not yet been produced in a form which met with general approval, and the whole ticket system was one which called for close attention in the hope of improvement being effected.

WOMEN CONDUCTORS.

In commenting upon the annual report of Aberdeen tramways department, which was presented to the Corporation on August 7, the Lord Provost said the women conductors were doing excellent work, and he hoped the Council would be able to retain them after the war. They would be glad to have the men back who had been fighting so bravely, but he did not think the Council would desire to discontinue women conductors for all time.

At Darlington the Tramways Committee have acted on the policy of discouraging women leaving permanent situations for temporary work on the tramways. Alderman C. W. Starmer, chairman of the committee, has informed the Corporation that the manager had as far as possible given employment only to the wives of motormen and conductors, and to other married women. Probably half of the women now employed were married.

Dundee Corporation on August 3, by nineteen votes to five adopted the recommendation of the Tramways Committee against employing women as conductors, as there are plenty of discharged soldiers applying for the work. During the discussion Councillor G. A. Johnston, chairman of the committee, asked the advocates of women conductors if they were going to turn their backs on brave men who had come from the front. The Council had decided that discharged soldiers were to get the preference of employment in all the departments, and they could not introduce women conductors until that resolution was rescinded. The employment of women would only be temporary, and he asked if it was worth while creating the dislocation and expenses that such a change would involve. Other speakers pointed out that 121 discharged soldiers had been taken on, but only 44 remained. One member said that the reason they left was because they were not receiving civility from the public; another asserted that they remained only until they obtained better employment.

In his annual report Mr. C. O. Silvers, general manager, Wolverhampton Corporation tramways, states that the shortage of male labour rendered it necessary to employ women conductors from September last. On March 31 forty-four were so employed, and their services have proved satisfactory.

THE IMPORT OF BATTERY VEHICLES.

We have received from the Electric Vehicle Committee a copy of the correspondence between that body and the Board of Trade in respect to the proclamation prohibiting the import of motor vehicles. In the first letter asking that electric battery chassis intended for commercial uses shall be most favourably treated under the licensing arrangements, Mr. F. Ayton, hon. secretary to the committee, advanced eight reasons in support of the request. Among them were the following:—(1) The usual cost of power for operating is approximately equal to petrol at 6*d.* per gallon; (2) the use of battery vehicles assists in conserving petrol supplies; (3) women or elderly men can very soon become proficient in driving battery vehicles, thus freeing men of military age for service; (4) simplicity and sturdy construction makes repairs a small item at a time when every mechanic is required for munition work; (5) the employment of power stations to produce electricity for charging battery vehicles is bound to improve the load factor as it has already done in Chicago and New York; (6) free importation will create such a demand that there will be some incentive after the war for British manufacturers to establish the building of such vehicles as a staple industry. A reply was received from the Department of Import Restrictions stating that if the Committee would send a statutory declaration that the chassis were to be used solely for commercial purposes the matter of their importation should have consideration.

ELECTRIC VEHICLE COMMITTEE.

A meeting of the Electric Vehicle Committee was held in London on July 28, Mr. R. A. Chattock presiding. It was announced that the Royal Automobile Club had nominated as their representative upon the Committee Mr. W. Worby Beaumont. Consideration was again given to insurance policies for electric vehicles. Correspondence with the Car and General Insurance Corporation, Ltd., was submitted, from which it appeared that they were willing to come into line with the suggestions previously made by the Committee that their standard electric vehicle policy should be altered so as to include the risk on the battery while the vehicle is in transit by road, rail or ship. Subject to this alteration, the Committee considered that the Car and General Insurance Co.'s policy met every reasonable requirement, and they decided to give their approval to it. Arising out of correspondence with the Rugby Urban Council in the matter of providing charging facilities for electric vehicles, the Secretary was directed to write and say that the Committee regretted the Council's decision not to provide such facilities at the present time. It should be noted that the British Thomson-Houston Co. are prepared, when their own arrangements admit and at times convenient to themselves, to charge electric vehicles passing through Rugby. The Secretary reported the action he had taken in connection with the report on electric vehicles made by Southwark Borough Engineer to the Works Committee of the Council and his action in this matter was approved. The date of the next meeting was fixed for September 29, at 2.45 p.m.

ALTERATION OF FARES.

West Hartlepool Council have represented to the Tramways Company in the adjoining district the dissatisfaction of the public with the abolition of the halfpenny fares.

The increased fares on Croydon Corporation Tramways, the Metropolitan Electric Tramways and the motor omnibuses running in the Croydon area, will take effect on August 14. On the Croydon cars the stages affected number seventy. The list has been advertised in the local newspapers.

After deciding to abolish season tickets on the Stirling and Bridge of Allan Tramways, the directors have agreed to issue them again. Considerable increases have been made in the charges. An annual ticket between Stirling and St. Ninmans formerly cost 30*s.*; the charge is now 45*s.* The increased cost of running the horse cars is given as the reason for the higher charges, and it has been stated that unless there is an improvement the cars may stop running.

At their August meeting Belfast Corporation adopted the Tramways Committee's annual recommendation as to fare stages during the current year. It was to the effect that no alterations be made. A councillor proposed an amendment that the penny stage on Falls Road should be extended to Milltown Cemetery. Councillor J. McCaughey, chairman of the Committee, warned the Corporation that they were treading on thin ice in regard to the tramway undertaking, but he agreed to bring the matter before the committee. The amendment was then withdrawn.

Wigan Tramways Committee have adjourned the question of altering stages and fares until a special meeting of the Council has been held to consider the financial position of the tramways. The Committee contemplate recommending a number of alterations with a view to increasing the receipts.

MISCELLANEOUS NEWS AND NOTES.

L. and N.W. Railway Electrification.—It is expected that the electrified section of the L. and N.W. Railway between Broad Street and Richmond will be opened for traffic on October 1.

Badge for ex-Service Men.—Salford Tramways Committee have given badges bearing the name of the Tramways Committee with the letters "D.S." (discharged soldier or sailor) to several discharged soldiers and sailors in their employ, pending the issue of the War Office badge.

The Military Service Act.—Exemption until October 31 only has been granted by the East Kent Appeal Court to ten men who were appealed for by the Chatham and District Light Railways Company. In twenty-six other cases an arrangement was come to with the military representative.

Effect of the Summer Time Act.—For the first three months of 1916 the power consumption of Darlington tramways increased by thirty-three per cent. For the June quarter the increase fell to twenty-seven per cent. The difference is mainly attributed to the Summer Time Act.

Melbourne Railway Electrification.—In consequence of the failure of efforts to secure the release of material in England for the electrification of Melbourne suburban railways, the Victorian Railway Commissioners have sent one of their number to London to confer with the Agent-General, Mr. Merz (their consulting engineer), and the contractors with a view to decide on the best course to be adopted.

Information to the Police.—Complaint was made by the police at Dudley, at an inquest on a child who was run over by a car, that the motorman refused to give them any information in regard to the accident. In support of his action the motorman directed the coroner's attention to several rules. Mr. Powers, representing the company, said when the rules were framed only ordinary street accidents were contemplated.

Tramway Soldier's Funeral.—The body of Corporal Morrison, Cameron Highlanders, who died in London of wounds received in action, was interred at Glasgow, on August 2. Before enlisting the corporal was a Glasgow Corporation motorman. The coffin was conveyed to the cemetery on a gun carriage with a military escort, and was also accompanied on foot by representatives of the male and female employees of the tramways department.

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Rewards for Loyal Employees.—Croydon Corporation have adopted a recommendation by the Tramways Committee that the sum of £350 be allocated to the employees who remained at work and undertook extra duty during the recent strike. The allocation is as subjoined:—Twenty-five motormen a £3 bonus; five male conductors at £3 each; thirty-six women conductors at £2; fourteen inspectors, two weeks' wages; twelve regulators, ditto; also three point lads, two men of the depôt staff, official staff.

Bristol Tramway Soldiers at the Front.—In a letter received by Mr. C. Challenger, manager of Bristol Tramways and Carriage Company, from an employee at the front, the writer states that most of the company's men who are serving in a local battalion came safely through the recent heavy fighting. Sergt. Hurley, of Horfield depôt, had the unpleasant experience of spending a day in a shell hole in "No-man's land," with other shells bursting around him, but when night came he was able to reach the lines.

Edinburgh Tramways Company Sued.—Judgment has been given in Edinburgh Sheriff Court in the action in which Mr. Hendry sued the Edinburgh and District Tramways Company for 2s., the cost of two cab fares expended by him on two separate occasions, when, being the holder of a three-halfpenny transfer ticket, the car system on the second portion of the journey had broken down. Sheriff Guy has sustained the pursuer's plea that the defenders were in breach of contract, and allowed a proof of the loss and damage sustained.

Damages Against West Ham Corporation.—A jury at Bow County Court awarded £20 damages to the owner of a horse that had to be slaughtered after stepping into a depression at the side of the tramway in Barking Road. Plaintiff alleged that the depression was three inches deep for a distance of three yards. Mr. J. Carruthers, permanent way engineer to the Corporation, said he saw this spot twice a week, and there was nothing very much the matter in February. About March 2 he put a gang on to repair one or two about an inch depressions, but the statements made as to the three-inch depressions were ridiculous.

Exeter Half-Fare Rides Withdrawn.—On the recommendation of Mr. H. C. Bartlett, the tramways manager, Exeter Council, have withdrawn the concession of half fares to soldiers and sailors. Mr. Bartlett drew attention to the increased cost of material, some articles having doubled in price. At the Council meeting several members suggested that the halfpenny fares should be limited to wounded soldiers. The Mayor observed that before the Committee could have power to differentiate they must clear away the halfpenny fares altogether. Councillor Munro remarked that they had arrived at a critical stage in the tramways undertaking. The cost of wear and tear was going to be considerably more than it had been.

An Innovation at Croydon.—Mr. T. B. Goodyer, tramways manager of Croydon Corporation, has invited the staff to appoint delegates to meet him from time to time to discuss freely matters connected with staff working. One motorman and one conductor is to be selected from each depôt to act as delegates, and it is proposed that these should meet at the manager's office at arranged periods. A box is to be provided at each depôt, in which suggestions may be placed for consideration at the conferences. The boxes will be cleared by the depôt inspector several days before the meetings, and the contents will be handed to the manager, so that the matters which it is suggested should be dealt with may be previously considered.

P.A.Y.E. System at Manchester.—Notices recently posted in Manchester cars indicate that passengers may where convenient pay their fares on the platform when entering the cars. It appears that since women conductors have been employed considerate passengers have been accustomed to hand their fares to the conductors and the women thus saved many unnecessary journeys up and down stairs. This practice, hitherto contrary to the regulations, rhas now been "legalised" by the following notice:—"Payment of fares by outside passengers.—In order to assist the guards, passengers intending to travel on the upper decks of the cars are requested to hand the exact amount of the fare to the guard on the platform before proceeding upstais. This method of payment is, however, not to be resorted to at busy loading places."

Searcity of Motormen at South Shields.—In his annual report the general manager of the South Shields Tramways states that eighty employees haue joined His Majesty's forces, or about sixty per cent. of the normal staff. Women conductors were introduced in November and have well adapted themselves to the work. It has been impossible to fill all the vacant motormen's places and the service has had to be reduced. Only thirty per cent. of the applicants for motormen's duties proved capable, and fifty per cent. of the motormen have been newly trained to the work. During the year the rates of pay have been increased by one halfpenny per hour, the standard rate being now one of the highest of any tramway undertaking in the country.

New York Tramway Strike Settled.—The employees of all the tramway lines of the borough of Manhattan, except the unimportant Second Avenue line, struck work on August 6. The tramways of the borough of the Bronx had been largely idle because of a strike during the previous week. The total of the tramways in New York, including the boroughs of Manhattan and the Bronx, but not Brooklyn, is stated by the press reports to be 150 miles of track, directly affecting nearly 1,500,000 travellers a day. The employees demanded recognition of their union and higher pay. They were receiving about 14*d.* an hour, while the tramway employees of other American cities were receiving 16*d.*, 18*d.*, and in some cases 20*d.* On August 7 a compromise was arrived at involving arbitration on the amount of the increase in wages and the ultimate recognition of the union. Before the settlement was reached the police had a busy time in defending the loyal employees. The police always travel free in New York.

L.G.O. Company's Miniature Rifle Ranges.—The fifth miniature rifle range erected by the London General Omnibus Company, Ltd. for the use of its employees was opened at the Training School, Milman's Street, Chelsea, on August 7. Colonel C. F. Colvile (director) presided, and the opening ceremony was performed by Lieut.-General Sir A. E. Codrington, who fired the first shots and, in declaring the range opened, said that it was probably the finest miniature range he had seen and would have gratified the heart of the leader of the movement, Lord Roberts. A vote of thanks to General Codrington was proposed by Mr. H. E. Blain, the operating manager, who said that, in addition to the five ranges now open on the company's premises, arrangements had been made at two other ranges for the employees to have facilities, so that range practice could now be obtained in practically every part of London. There were 1,800 members of the rifle club. The vote of thanks was seconded by Mr. G. J. Shave and suitably acknowledged. General Codrington then presented the Society of Miniature Rifle Ranges certificate to Mr. F. Fox, who had been selected to represent the county of Middlesex for the Queen Alexandra Cup. A match was then fired between Mr. Lansdown's team and Mr. Eden's team, resulting in a victory for the former by 376 to 372. Colonel Colvile presented the winning team with silver medals and also handed the Society of Miniature Rifle Clubs' National Roll of Marksmanship (A Class shot) to: F. Smith, A. Wright, S. W. Pooley, S. Vince, J. C. Williams, S. F. Eden, L. D. Cromack, and W. Stainer.

The Wigan Accident.—At the inquest on the passenger who died from injuries received by the overturning of a car on the Wigan tramways, the motorman, who had been working on the section for nearly three years, expressed the opinion that the front wheels jumped the metals at the points and ran off the line from the points to the crossing. The crossing seemed to turn the car across the road and the back wheels keeping on the right track caused the car to turn over. It was not possible to stop the car before reaching the crossing. Mr. Frank Buckley, the general manager, said the car was fitted with the handbrake, a slipper brake, and an electric brake. It had been overhauled the previous day. On a weekday about 168 cars passed through the points at the place where the accident happened, and about 180 on a Saturday, and there had never been any trouble there before. If the theory of the motorman was correct and the wheels took the wrong road, any projection getting into the points would stop the point tongue going back into the socket. Apart from some foreign substance getting into the rail there was nothing to account for the car leaving the rails. The department often experienced trouble in these days of heavy motor vehicles in consequence of bolts and nuts getting into the track. This happened every day. The accident, he said, was unexplainable at present. Mr. A. T. Gooseman, borough engineer, said his permanent-way foreman made a weekly inspection of every section of the track, and he himself made an inspection periodically. The particular section of the track where the accident happened was in excellent condition. The gradient was about one in twenty-one. He could not account for the accident, as the cars took the points exceptionally easily, and after the accident the point was closed. The points had a very strong spring. Mr. Fred Bland, of Sheffield, director of the tramways department of Messrs. Edgar Allen & Co., said that after examining the points and crossing he saw nothing to account for the wheels going off the line. The Coroner: Is there anything from what you can see of the track to-day to account for this accident.—No. The type of crossings and points had been in use throughout Great Britain for thirty years, and he had never known a similar accident.—The jury returned a verdict of accidental death.

PERSONAL.

Mr. H. Evans, superintendent of tramways and ferries, Khartoum, is now at home on leave.

Mr. R. B. Leach, general manager, Heywood Corporation Tramways, and borough electrical engineer, has been appointed electrical engineer for Loughborough.

Mr. Frederick Whitridge, president of the Third Avenue Electric Railroad, who was stated to be spending a vacation in England, was blamed by the public authorities of New York for the strike of tramway employees in that city. It is alleged that his company had ignored the arbitration agreement with the men.

Mr. Peter Fisher, general manager, Dundee Corporation tramways, is the president this year of the Municipal Tramways Association. At the August meeting of the City Council Bailie Buist remarked that in ordinary circumstances the conference would have been held in Dundee, instead of in London. He therefore suggested that the Lord Provost should accompany the chairman and the manager to the conference, but the suggestion was not adopted.

Mr. R. S. Pilcher, general manager and engineer, Aberdeen Corporation tramways, was warmly congratulated by Councillor Robertson, chairman of the Tramways Committee, on the occasion of the presentation of the yearly accounts to the Corporation. That the undertaking had been so successful, the chairman remarked, was entirely due to the management of the general manager, supported by a loyal staff. Late and early they would always find Mr. Pilcher on duty. His work during the past year had been exceptionally trying, with so many of the staff on service, and no doubt at the end of the year the Corporation would recognise Mr. Pilcher and his staff for the extra work they had so willingly carried out. The Council applauded the latter remark and the applause was renewed at the end of the observations that fell from the Lord Provost. His lordship said the success of the tramways was in a great measure due to the efficient manner in which the general manager had carried out his duties. They would have noticed how very nearly they had lost Mr. Pilcher to Ireland, and while they regretted that he failed narrowly to get the promotion he deserved, they were thankful to be able to keep him a little longer.

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The Roll of Honour.—Since the British advance in France there has been an increasing list of killed and wounded among tramway soldiers who are sustaining the honour of the Empire on the field of battle. It is not in many cases that publicity has been given to the letters of company officers intimating deaths to relatives. All tramway workers will be interested in the appended extract from a letter from Lieut.-Col. W. D. Sanderson, commanding the Loyal North Lancashire Regt., announcing the death of Private J. Livesay, formerly on the Blackburn Corporation Tramways. The deceased was the colonel's orderly, and he "always accompanied me on my visits to the trenches. I feel I have lost a personal friend. He was always so cheerful and ready for his duty at any time. Please accept my deep sympathy."

CONTRACTS AND ORDERS.

The Motor Rail and Tramcar Company, Ltd. have supplied a number of petrol tractors to the War Department.

Peckham Truck and Engineering Company, Ltd., have a contract to supply fifteen Peckham trucks to Sheffield Tramways Committee.

Salford Council have accepted the tender of the British Westinghouse Company for the supply of a 1,000-kw. rotary converter and transformer.

D. Napier and Son, Ltd., Acton, W., obtained a contract for the supply of motor lorries in the last monthly contracts called for by the War Office.

Bradford Tramways Committee have arranged for Messrs. Clay and Atkinson to continue to supply phosphor-bronze castings until December 31 next.

Ford Motor Company (England), Ltd., Ansdell Street, Kensington, W. have a contract to supply a number of motor delivery vans to the War Office.

The Improved Wood Paving Company, Ltd. are supplying 100,000 creosoted deal paving blocks to Lambeth Borough Council, at £19 11s. 0d. per 1,000 blocks.

Wolverhampton Council have placed a contract with Herbert Morris, Ltd., for a forty-ton travelling crane, at £1,450, and with J. E. Perry and Son for the erection of a steel chimney, at £540.

Manchester Electricity Committee have awarded the following contracts: Hydraulic Engineering Company, coal-unloading plant (with licence to sublet turntable to Dick, Kerr and Co., Ltd.); five 1,000-kw. transformers, Ferranti, Ltd.; 250-kw. and 500 kw. transformers, Ferranti, Ltd.; cable, British Insulated and Helsby Cables, Ltd., and C. Macintosh and Co., Ltd.; varnish, Pinchin, Johnson and Co., Ltd. The following are twelve months' contracts for supplies: Electrical accessories, General Electric Company, Ltd.; incandescent and radiator lamps, British Thomson-Houston Company; bitumen tape and linen tape, W. T. Henley's Telegraph Works Company, Ltd.

FINANCIAL REPORTS AND MEETINGS.

North Melbourne Electric Tramways and Lighting Company.—The net profits for the year ended September 30 were £11,732.

Oldham, Ashton and Hyde Tramways Company.—The Board announce an interim dividend on ordinary shares at the rate of five per cent. per annum (6d. per share).

Paisley District Tramways Company.—The directors have declared an interim dividend at the full rate of five per cent. per annum on preference shares for the half-year.

Swansea and Mumbles Railway Company.—An interim dividend has been declared at the rate of nine and three-eighths per cent. per annum on ordinary shares, for the half-year.

Mumbles Railway and Pier Company.—For the past half-year the directors have declared an interim dividend at the rate of seven and one half per cent. per ann. (7s. 6d. per share) on ordinary shares.

Millars' Timber and Trading Company.—The report for 1915 states that the balance of profit, before deducting interest on debenture stock or depreciation, is £75,172, which with £73,414 brought forward makes £148,583. Interest on debenture stock and the amount payable to the sinking fund in lieu of interest on debenture stock cancelled amount to £21,773; there has been carried to depreciation reserve account £25,000; the dividend on preference shares for the year amounted to £51,000; leaving a balance to carry forward of £50,810.

L.C.C. Tramways Record Week.—For the week ended August 2 the traffic revenue for the tramways of the London County Council amounted to about £52,300. This is a record for the undertaking. During the week 720,177 children travelled by tramway at reduced fares. Advantage of these reduced fares has been taken to a greater extent since the schools were closed for the summer holidays by children going to parks, open spaces, and places of interest. A great portion of the increased receipts is due to the presence of the captured submarine minelayer at the Temple pier. During ten days to August 4, 170,265 persons paid for admission to the pier, and many thousands more journeyed to the Embankment to obtain a free view of the vessel, which is remaining until August 15.

South Shields Tramways.—Notwithstanding the difficulties caused by the war, the results of the year's work have been very satisfactory. Mr. J. C. Whiteley was appointed general manager and engineer about fourteen months ago, and the report now published covers the first year of his management. Alderman Wylie, chairman of the Tramways Committee, in moving the adoption of the annual report, at a recent Council meeting, described the past year as a very strenuous one. The difficulties that had been met with had been almost insurmountable, but their revenue had been greater than in any previous year. The total expenses had been heavier by £801 because they had paid during the year £1,022 to make up the wages of men who had joined the colours; but working expenses were actually less than in the previous year. They finished the year with a surplus of £6,504, after paying interest and sinking fund charges, which he thought was a very creditable performance. Of this amount £2,400 would go to the relief of rates and the balance would be placed to the credit of the reserve fund, which would, in consequence be raised to £35,000, this being equivalent to 10·6 per cent. of the capital outlay. As they were only allowed to accumulate as a reserve an amount equal to 20 per cent. of their expenditure they could only place another £700 to that fund. They carried people a greater distance for a penny than any other tramway undertaking in the country, viz., 3·1 miles. These results were due to careful management and the good work of every member of the staff. A summary of the results for the past three years is appended:—

	1915-16.	1914-15.	1913-14.
Capital expenditure	£181,607	£181,097	£173,590
Loans outstanding	£148,577	£155,213	£140,912
Total track mileage	10·25	10·25	10·25
Number of cars in stock ...	40	40	35
Traffic revenue	£41,326	£39,275	£37,744
Total revenue	£41,826	£39,846	£38,331
Working expenses	£24,585	£24,804	£22,585
War allowances	£1,032	£946	—
Gross balance	£15,500	£14,330	£15,746
Net profit	£6,504	£5,594	£7,107
Passengers carried	11,163,378	10,479,421	10,005,164
Average fare per passenger...	·873d.	·899d.	·954d.
Car mileage	824,887	927,728	808,015
Units per car mile	1·347	1·203	1·231
Power cost per car mile ...	1·0099d.	1·1798d.	1·1710d.
Traffic receipts per track mile	£4,026	£3,826	£3,677
Traffic receipts per car mile	12·0237d.	10·1663d.	10·0873d.
Expenses per car mile ...	7·0048d.	6·4322d.	6·0360d.
Ratio of expenses to revenue	58%	62·4%	58·02%

Aberdeen Corporation Tramways.—In moving the adoption of the accounts of the Tramway Committee for the year ended March 31, Councillor Robertson said the revenue showed an increase of £6,326, which was a very large one considering the number of men away from the town. Expenses were up £6,073, mainly owing to income tax, war bonus, repairs to the track, and dependants' allowances. The profit of £9,607 was not quite so large as in the previous year. Out of that profit the Corporation had power to dispose of £3,232 and the committee recommended that £2,000 be allocated to the common good, and £1,232 in carrying out city improvements. He called council's attention to the fact that the accumulated funds had reached £267,567, while the capital expenditure was only £368,709. Appended is a summary of the reports for three years:—

	1916-15.	1915-14.	1914-13.
Capital expenditure	£368,709	£366,332	£357,111
Amount outstanding ...	£201,972	£213,335	£219,711
Traffic revenue	£92,784	£86,614	£84,275
Total revenue	£94,328	£88,002	£85,266
Working expenses	£55,002	£51,050	£47,036
War allowances	£2,505	£875	-
Gross balance	£36,130	£36,477	£38,230
Income tax	£3,275	£1,626	£983
Net profit	£9,607	£11,000	£14,062
Passengers carried	26,593,730	24,048,816	22,218,142
Fare per passenger	·83d	·86d.	·91d.
Car mileage	1,968,615	1,909,009	1,832,587
Units per car mile	1·260	—	1·184
Power cost per car mile ...	1·061d.	1·027d.	·950d.
Traffic receipts per track mile	£3,313	£3,121	£3,064
Traffic receipts per car mile	11·31d.	10·80d.	11·04d.
Expenses per car mile ...	7·00d.	6·48d.	6·16d.
Ratio of working expenses ...	61·70%	58·54%	55·16%
Track mileage	14m. 4f.	14m. 3f.	14m. 3f.
Number of cars in stock ...	83	83	77

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-four of the principal tramway undertakings in the United Kingdom for the week ended July 29, give total receipts of £203,348, or £23,313 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or 69 more than for the corresponding week. The receipts this year were at the rate of £91 3s. 9d. per mile of single track, and last year at the rate of £83 6s. 2d., thus showing an increase for the week of £7 17s. 7d. per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

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ABCHURCH YARD, CANNON STREET, LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27, 1914	Cash. Aug. 10.	A Week Ago.
5%	5%	Alabama Traction. 5% 1st. Mt.	—	67	69¾	69
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4¾	76/3	76/3
4%	4%	Do. 4% Deb. ...	100	91	75¼	75
4½%	4½%	Do. 4½% Deb. ...	100	98½	76	75¼
5%	5%	Do. 5% Deb. ...	100	96	76½	77
7d	1/—	Auckland Elec. Trams. Ord. ...	1	1⅝	20/6	20/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	94	94
6/—	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11¾	10¾xd	10¼xd
4½%	4½%	Do. 4½% Deb....	100	96	83	83
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	92	92
$¼	$1	Brazilian Trac. & Power Ord....	$100	66	61½	62
$1¼	$1½	Do. 6% Cum. Pref.	$100	97	94½	94½
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6⅝	6⅝
2/6	2/6	Do. 5% Cum. Pref.	5	5	85/-	86/10½
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92½	92½
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	40¹⁄₁₆	40¹⁄₁₆
6%	5%	Do. Pref. Ord....	100	106	47	43
5%	5%	Do. 5% Cum. Pref.	100	103	65	62
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	80½	80½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	65	64½
—	—	Brit. Elec. Trac. Ord.	100	—	35½	35½
—	— *	Do. 6% Cum. Part Pref. ...	100	—	80½	80½
5%	5%	Do. 5% Deb.	100	92	85	85
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	70	70
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	92½	92½
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	6⅝	6⅝
1/3	1/3	City of B.A. Trams.	5	5½	91/10½	93/9
5/-	4/-	Dublin United Trys 6% Pref.	10	12	10⅞	10⅞
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅜	2/1½	2/1½
5/6	6/-	Lanarkshire Trys. Co.	10	10½	9¹⁵⁄₁₆	9¹⁵⁄₁₆xd
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9½d.	9½d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	1⅝	2/3	2/3
6d.	6d.	Do. 5% Pref.	1	⅝	8/7½	9/10½
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	59¾	59¾
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88½	88½
5%	5%	Do. 5% Inc. Deb.	100	88½	82	81
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	46¾	46¾
3/-	3/-	Madras Elec. 6% Pref. ...	5	5¹⁄₁₆	96/6	96/3
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67½	67½
$1¼	$1¼	Manila Elec. R. R. & Light ...	$100	102	70	70
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	79½	79½
$1¼	$1¼	Mexico Trams. Common ...	$100	70	27½	27½
5%	5%	Do. 1 Mt. 5% G.B.	—	8¼	40½	40½
6%	6%	Do. 6% Mt. Bds.	100	76	34	34
4½%	4½%	Montreal St.4½%Stg.Debs.(1922)	100	100	96½xd	96½
4½%	4½%	Do. 4½% Stg. Debs.	100	99	94	94
1/2*	1/2*	National Steam Car	1	½	21/3	22/7½
9½d.*	9½d.*	New General Traction	1	¼	7/9	7/9
6d.	8½d.	Northern Gen. Trans. Ord. ...	1	⅜	16/-	16/-
6/-	5/-	Para Elec. Rlys. Ord.	5	4¼	66/-	66/-
5%	5%	Do. 5% 1st Deb.	100	80½	73½	73½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80⅜xd	80⅜xd
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	⅓	11/3	11/3
8d.	10d.	Provincial Trams. Ord.	1	¾	16/6	16/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84	84
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	91⅞	91⅞
5%	5%	1st. Mt. 5% 50 yr.	100	89½	82⅝	82⅝
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	90½	90½
5%	5%	Do. 5% Perp. Deb.	100	99½	81½	82
—	—	Singapore Elec. Trams	5/-	½	4/10½	4/10½
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	96½xd	96½xd
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	85	85
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	92½	92½
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	78½	76½
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	9/3	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	90/-	90/-
		Metropolitan Dist. Ord. ...	100	21½	18¾	18¾
		Undgd. Elec. Rys. of London ...	10	2½	39/4½	39/-
		Do. "A"	1/-	⅜	6/3	6/4½
		Do. 4½% Bds of 1933 Rd.	—	99	102	101⅜
		Do. 6% 1st Cum. In. Db.	100	114	107½	106⅜
		Do. 6% In. Bonds Rd. ...	—	88	91¹¹⁄₁₆	91¹¹⁄₁₆

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1915	Latest Return. 1916	Aggregate. Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	Aug. 5	£51,413	£49,487	32	£1,577,878	— £5,149
Auckland (28 days)	June 30	19,139	21,705	52	274,763	+ 7,515
Ballarat and Bendigo	May 21	2,885	3,855	8	7,582	+ 777
Brazilian Traction Mlrs.	June	6.591 940	6,961,000	26	39,950,000	+2,265.890
Brisbane	Apr.	29,890	32,575	18	129,450	+ 12,610
British Columbia $	June	498,093	529,078	52	6,602,624	— 703,939
Buenos Aires Lacroze	July 1	41,460	38,439	5	38,439	— 3,021
Burmah Tramway ... Rs.	July 29	3,726	3,437	52	...	+ 3,920
Calcutta Rs.	Aug. 5	65,826	72,869	32	2,091,762	+ 98,984
Cape Town	June	...	12,920	...	...	...
Carthagena & Herrerias	July 30	2,157	2,371	31	18,740	+ 5,935
Cordoba	May	14,494	14,868	9	28,921	+ 818
East India	July	2,231	2,220	52	25,370	+ 1,586
Hong Kong $	July 1	11,218	15,226	29	355 626	+ 78,487
Kalgoorlie	May	3,269	2,921	21	12,437	— 1,035
La Plata	July	4,054	3,909	31	29,835	+ 15
Lima	Apr.	31.633	33,556	18	134,629	+ 5,614
Lisbon Escu.	June	...	202,451	...	...	...
Madras (2 weeks)	July 31	30,490	32,762	31	437,111	+ 31,700
Manila $	Apr.	117,450	124,350	...	505,381	+ 16,765
Manaos Rs.	May	...	152,554	...	...	...
Melbourne	May	...	69,275	...	...	...
Montevideo	July	25,161	25,220	39	266,288	+ 14,435
Pernambuco	Aug. 6	2,850	3,125	31½	92,233	— 5,123
Peruvian $	July	724,838	835,430	5	835,430	+ 110,592
Port Elizabeth	June	...	2,809	...	...	...
Rangoon	July	4,629	4,357	31	32,938	— 1,436
Shanghai $	June 19	26,314	29,017	...	...	...
Singapore $	July 1	11,406	12,152	26	322,147	+ 36,099
Toronto $	June	787,558	884,491	26	5,335,199	+ 525,136
Winnipeg	June	255,549	254,686	26	1,701,474	— 50,782

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	Latest Return. 1916	Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Incr. or Dec.
Aberdare	Aug. 1	£396	£420	+ 24	18	£6,752	+ £469
Aberdeen Corporation	,, 3	2,041	2,074	+ 33	9	17,468	+ 129
Accrington Corp.	,, 2	633	563	— 70	18	10,478	+ 213
Ayr Corporation	,, 5	607	683	+ 76	12	5,750	— 253
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	,, 6	1,488	1,663	+ 175	18½	27,994	+ 2,279
Birmingham Corp.	,, 5	15,371	17,010	+ 1,639	18	298,509	+ 50,956
Do. Motor Omnibuses	,, 5	1,059	1,186	+ 127	18	17,713	+ 2,048
Blackburn Corp.	,, 2	1,919	1,347	— 572	18½	24,216	— 1,167
Blackpool & Fleetwood.	,, 5	2,264	1,662	— 602	31	21,249	+ 1,142
Blackpool Corp.	,, 3	5,074	3,587	— 1,487	18	34,668	+ 4,650
Bolton Corporation	,, 6	2,771	3,096	+ 325	19	53,617	+ 3,067
Bournemouth Corp.	,, 9	2,952	3,303	+ 351	19	43,768	+ 1,881
Bradford Corporation	,, 5	7,415	7,355	— 60	18	125,011	+ 270
Brighton Corporation	,, 6	1,776	1,817	+ 41	18½	22,702	+ 1,409
Bristol	,, 4	13,930	12,144	— 1,786	31	304.730	+ 9,903
British Elec. Federa'n	*	...	...	...	...	...	...
Burnley Corporation	,, 5	1,645	1,797	+ 152	19	32,558	+ 1,295
Burton-on-Trent Corp.	,, 6	365	300	— 65	18	4,878	— 608
Bury Corporation	,, 6	1,423	1,560	+ 137	19½	27,086	+ 1,017
Cardiff Corporation	July 22	2,828	3,139	+ 311	16	47,494	+ 2,745
Chatham & District	Aug. 3	1,628	1,528	— 100	31	36,475	+ 1,179
Chesterfield Corp.	July 27	339	299	— 40	17	4,758	+ 117
Colne Corporation	,, 24	234	264	+ 30	...	...	...
Cork Electric	Aug. 3	530	643	+ 113	31	15,390	+ 31
Croydon Corporation	Apr. 28	1,726	1,403	— 323	4	5,417	— 666
Derby Corporation	Aug. 5	1,293	1,281	— 12	18½	20,769	+ 947
Dover Corporation	*	...	...	...	...	...	...
Dublin & Lucan	,, 4	219	220	+ 1	5	971	+ 75
Dublin United	July 28	6,073	7,629	+ 1,556	30	173,427	— 6,822
Dundee City	Aug. 2	1,379	1,523	+ 144	11⅜	15,850	+ 162
East Ham Corporation	,, 5	1,494	1,456	— 38	18½	24,326	— 61
Exeter Corporation	July 22	417	467	+ 50	17	6,636	— 74
Glasgow Corporation	Aug. 5	21,000	23,931	+ 2,931	9⅜	221,179	+ 18,912
Glasgow Subway	,, 5	948	1,018	+ 70	31	36,123	+ 3,816
Glossop (U. Elec. Supp.)	,, 5	141	152	+ 11	32	4,340	+ 460
Halifax Corporation	,, 1	2,520	2,551	+ 31	17½	40,475	— 127
Do. Motor Omnibuses	,, 1	57	59	+ 2	17½	850	— 71
Hastings & District	,, 4	1,794	1,623	— 171	31	28,865	+ 682
Huddersfield Corp.	,, 5	2,992	3,246	+ 254	18	54,016	+ 4,460
Hull Corporation	,, 5	3,376	3,202	— 173	18	56,971	+ 47
Ilford U.D.C.	,, 5	837	787	— 50	18	12,820	+ 556
Ilkeston Corporation	,, 9	141	167	+ 26	19	2,643	+ 102
Ipswich Corporation	,, 5	830	612	— 218	18	10,018	— 180
Isle of Thanet	,, 5	1,198	791	— 407	44	13.643	— 2,771
Kilmarnock Corp.	,, 5	174	192	+ 18	11½	2,084	— 80
Lanarkshire	,, 3	2,071	2,481	+ 410	31	69,602	+ 10,633
Lancashire United	,, 2	2,313	2,061	— 252	31	54,337	+ 1,499
Leeds City	,, 5	10,922	10,625	— 297	19	179,903	+ 13,375
Leicester Corporation	*	...	...	...	...	...	...
Leith Corporation	,, 5	762	992	+ 230	11½	10,535	+ 1,061
Leyton U.D.C.	,, 3	2,062	1,999	— 63	18	30,375	+ 147
Liverpool Corporation	,, 5	14,997	15,726	+ 729	31½	431,855	+ 18,790
Llandudno & Colwyn B.	July 28	570	580	+ 10	34½	9,938	— 213
London County Council	,, 19	46,999	48,584	+ 1,585	15½	755,621	+ 98,068
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation	*	...	...	...	...	...	...
Maidstone Corporation	Aug. 3	306	256	— 50	18	3,941	— 170
Manchester Corp.	,, 5	18,324	19,671	+ 1,347	18	347,611	+ 37,708
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	July 29	230	258	+ 28	17½	3,744	+ 280
N'castle-on-Tyne Corp.	,, 29	6,632	7,371	+ 739	17	112,716	+ 4,655
Newport (Mon.) Corp.	Aug. 5	963	1,040	+ 77	18	16,923	+ 1,150
New St. Helens & Dist.	,, 2	1,716	1,260	— 456	5	5,501	— 235
Northampton Corp.	,, 4	962	785	— 177	18	12,658	— 1,663
Nottingham Corp.	,, 3	4,419	4,187	— 232	18	69,448	+ 141
Oldham Corporation	,, 6	2,381	2,726	+ 345	21	48,837	+ 3,037
Portsmouth Corp.	July 29	2,899	3,319	+ 420	18	47,652	...
Preston Corporation	Aug. 2	982	1,120	+ 138	17⅜	19,364	+ 1,968
Provincial	,, 5	3,235	3,092	— 143	44	98.297	+ 5,000
Reading Corporation	July 27	815	903	+ 88	16⅜	13,930	+ 539
Rhondda Tramways	,, 27	1,134	1,428	+ 284	30	37,077	+ 2,398
Rochdale Corporation	Aug. 5	1,728	1,927	+ 199	18½	33,627	+ 1,032
Rotherham Corp.	,, 9	1,216	1,784	+ 532	18⅜	28,042	+ 6,454
Salford Corporation	,, 7	5,080	6,089	+ 1,009	18⅜	103,559	+ 5,572
Sheffield Corporation	,, 6	9.691	10,782	+ 1,091	19½	199.819	+ 32,226
Southampton Corp.	,, 2	1,814	1,935	+ 121	17½	28,983	+ 2,035
Southend-on-Sea Corp.	,, 2	1,796	1,430	— 366	18	15,782	+ 73
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	,, 5	1,015	1,012	— 3	18½	15,127	+ 388
Sunderland Corp.	,, 6	1,949	1,939	— 10	18	29,855	+ 1,571
Sunderland District	,, 2	812	785	— 27	40	23,691	+ 1,245
Swindon Corporation	July 26	199	216	+ 17	16⅜	3,337	— 7
Torquay Tramways	Aug. 3	782	863	+ 81	31	16,408	+ 611
Tyneside Trys. & Tmrds.	July 26	659	845	+ 186	4	2,713	+ 83
Wallasey Corporation	Aug. 5	1,885	1,759	— 126	18½	25,505	+ 612
Walsall Corporation	,, 5	1,026	871	— 155	32	25,160	+ 2,465
Walthamstow U.D.C.	,, 5	1,286	1,425	+ 139	18	20,261	+ 2,575
Warrington Corp.	July 20	471	477	+ 6	16	7,685	+ 509
West Ham Corporation	Aug. 3	3,595	3,571	— 23	17⅜	58,852	+ 2,229
Wigan Corporation	July 27	1,578	1,763	+ 385	17	28,281	+ 1,695
Wolverhampton Corp.	*	...	...	...	...	...	...
Yorkshire (W Riding)	Aug. 6	2,355	2,090	— 265	32	55.013	+ 4,456

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

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WEEKLY LIST OF TENDERS INVITED.

PORTSMOUTH CORPORATION TRAMWAYS COMMITTEE.

The Tramways Committee of the above Corporation invite tenders for the supply of the undermentioned goods from October 1, 1916, to March 31, 1917:—

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,, H.—Brake blocks.
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The specification and form of tender may be obtained upon application to the Engineer, Mr. V. G. Lironi, M.I.M.E., A.M.I.E.E., Engineer's Offices, Vivash Road, Fratton, Portsmouth.

Tenders marked "Tender for ——," to be delivered to the Town Clerk, Town Hall, Portsmouth, not later than 10 a.m. on Tuesday, August 29, 1916.

The form of tender must include a declaration that the person making the tender pays the rates of wages and observes the hours of labour and conditions contained in the Corporation Fair Wages Clause.

The Committee do not bind themselves to accept the lowest or any tender.

W. R. SPAVEN,
General Manager.

Town Hall, Portsmouth.
August 15, 1916.

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The directors do not bind themselves to accept the lowest or any tender.

T. MORRISON,
Secretary.

Secretary's Office,
Amiens Street Terminus, Dublin.
August 16, 1916.

MANCHESTER CORPORATION TRAMWAYS.

The Tramways Committee of the Manchester Corporation are prepared to receive Tenders for the supply of the following:—

(a) Permanent way special track work.
(b) Permanent way point tongues and crossings.

Specifications and forms of tender may be obtained on application to Mr. J. M. McElroy, General Manager, Corporation Tramways, 55, Piccadilly, Manchester, on deposit of £1 1s. for each specification, which will not be returned except on receipt of a bona-fide tender.

Tenders are to be addressed to the Chairman of the Tramways Committee, 55, Piccadilly, Manchester, and must be received not later than 10 a.m. on Tuesday, September 12, 1916.

The Committee do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester.
August 18, 1916.

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BOROUGH OF HEYWOOD.

ELECTRICITY DEPARTMENT.

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(By order) GEO. G. BOUCHIER,
Town Clerk.

Town Clerk's Office,
Heywood.
August 17, 1916.

COUNTY BOROUGH OF WEST HAM.

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GEORGE E. HILLEARY,
Town Clerk.

Town Hall, West Ham.
August 11, 1916.

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SATURDAY, AUGUST 19, 1916.

PUBLIC VEHICLE DRIVERS.

Some importance both for London and provincial traffic undertakings attaches to a report recently issued from the Home Office, dealing with the qualifications of drivers of public motor vehicles. It had been suggested that partially disabled soldiers might be employed as drivers in the Metropolis; and the Home Office promptly entrusted to a committee the consideration of the question whether the suggestion could be adopted with safety to the public. Regarded from the point of view of the tramway and omnibus businesses, which carry the great majority of those travelling in the streets, the constitution of the committee was not as representative as could have been desired. Of the eight members only one is attached to those interests, but in Sir Albert Stanley the two descriptions of traffic had an admirable exponent, while the numerous witnesses included representatives of the London County Council and West Ham Tramways, the London General Omnibus Company and the National Steam Car Company. Provincial licensing authorities were represented by the chief constables of Liverpool, Manchester, and Bristol. There was no difference of opinion in the recommendations arrived at, for the question in both its broad and minute aspects is one that admits of no divergency of view. The Commissioner of Police is bound by statute to satisfy himself as to the "fitness for such situation" of each candidate for licensing whose application he approves, and greatly as the committee sympathised with men who have been injured in the war, they could not recommend any important relaxation of the standard of physical fitness. The only concession they advise is that the head of the police should have power to decide on its merits any case in which the man has lost an eye, while they recommend a continuance of the existing similar practice in cases of loss of one or more fingers, or other damage to the hands, limitation of movement of joints of the upper and lower extremities, or shortening of the lower extremities, and the results of injuries to nerves of limbs. In doubtful cases they advise a power of reference to a special medical referee. Probably only in these minor cases of injury will men, whether drivers before the war or not, think of applying for licenses, for no representatives of disabled men accepted an invitation to give evidence. They were not altogether unrepresented, as the witnesses included the instructor at Roehampton House who trains men who have lost a limb to become motor drivers. The committee also witnessed a demonstration by motor-car drivers who have been trained since losing a leg. While not disputing that such men may be competent to manage private cars, there is reason for supporting the committee's expression of hope that as far as possible disabled men will be encouraged in other occupations than that of motor driving. With a yearly increase in the number of cases of death and serious injury caused by vehicles in the streets, there can be no ground for relaxing the standard of physical qualification required for the exacting task of driving public conveyances. Indeed, if the upward tendency continues, the demand may reasonably be insisted upon that drivers of commercial and private motor vehicles shall undergo a test of their efficiency. In the case of drivers of public motor vehicles this examination by the police is a very strict one, while tramcar motormen are required to produce a certificate of competency from the authority by whom they are to be employed. It is worthy of note that the committee attribute the increased number of accidents caused by private and trade motor vehicles to the introduction of labour of less highly trained quality during the war. If justification were needed for the medical examination that tramway and omnibus undertakings require would-be employees to undergo, it is to be found in the statement that during the past three years the London licensing authority have had cognisance of 181 men being medically rejected, while every year several hundreds of medical certificates are not returned by applicants.

LONDON WAR WORKERS' OMNIBUSES.

Little publicity has been given to the great services that the London General Omnibus Company and Thos. Tilling's Omnibus Company have rendered to munition workers and to the country. Tilling's motor omnibuses have been running for years between Croydon and Woolwich, and during the war the service has been greatly augmented, thus providing facilities for a large area of the south-eastern part of the metropolis which was without convenient railway communication with the Arsenal and the numerous munition works outside of the district of the London County Council. The greatest increase of the omnibus service has, of course, been provided by the London General Omnibus Company, whose vehicles link up all parts of the metropolis with the various munition areas. An indication of the extent to which the services running to Woolwich have been added to will be gathered from the appended figures. On routes 53 and 53A the increase since the outbreak of war has amounted to thirty-seven per cent., on routes 101 and 101B to fifty-nine per cent., while on routes 75 and 75A the increase is no less than 146 per cent. In addition, three entirely new services have been established. In view of these figures, the statement in a report recently made to the London County Council that accommodation provided by motor omnibuses in the Woolwich district showed only a slight increase, appears to have been based on insufficient knowledge of the facts. The war services performed by the Council's tramways have been so great that there could hardly be any temptation on its part intentionally to depreciate the services of other traffic authorities.

One of the developments during the past three months has had an important bearing on the question of national economy. At the instance of the Ministry of Munitions two tramway undertakings in north-east Kent gave up their intention to obtain powers to enable them to run omnibuses in order to link up with munition works, and arrangements were made with the omnibus companies to extend their services. Two new services recently put on in south-east London provide more direct and rapid communication with the Arsenal and factories than is given by the County Council and other tramways. On August 15 yet another service was instituted by the L.G.O.C. for munition workers and the public in a very wide area. The vehicles run between Farnborough (Kent) and Crayford, by way of Orpington, St. Mary Cray, and Bexley. This links up with Woolwich, Dartford, and Gravesend tramways. The fare is 6*d.*, and the first omnibus starts at 5.15 a.m. The new service is the outcome of negotiations between the Minister of Munitions, Vickers, Limited, and other firms and the local councils.

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DISABLED MEN AS MOTOR DRIVERS.

The report has been issued of the Committee appointed by the Home Secretary to consider whether, having regard to the normal conditions of traffic in the Metropolis, licences to drive motor cabs, motor omnibuses, or tramcars should be granted to men who suffer from some partial physical disability by loss of a limb or other similar cause, and, if so, within what limitations. The members of the committee were Messrs E. L. D. Elliott (chairman), C. W. Bowerman, M.P., J. W. Orde (secretary Royal A.C.), R. J. Simpson, and A. Smith (president of the Union of Licensed Vehicle Workers), Major A. Tudor Craig, Sir Frederick Eve, F.R.C.S., and Sir Albert Stanley. Mr. H. A. Tripp, of the Metropolitan Police Office, was secretary to the committee. In the course of their report they state that "we entered upon our inquiry with a strong and natural sympathy for the men who, having suffered some serious physical disability in the service of King and country, are liable to be thenceforward handicapped in earning their livelihood. While it is greatly to be desired that these men should not suffer in the matter of earning their livelihood, it is of paramount importance that the public should not be exposed to undue risks. It is essential not to reduce the standard of efficiency in drivers of public vehicles, since even under the present system (which virtually excludes men so incapacitated) there is no margin of safety to spare. While the total number of accidents shows a tendency to decline, the numbers of serious cases shows an upward tendency. In the case of private motor-cars and trade and commercial motor vehicles, we feel that the increase in the aggregate must be assigned (partially at least) to the introduction of labour of an inferior—or less highly trained—quality. This consideration has a direct bearing on our investigation. We feel no doubt that in the case of public vehicles, the logical outcome of introducing drivers who are less efficient would be an increase of the street casualties and a serious additional toll of fatalities. With this opinion definitely formed in our minds, we are not prepared to take the responsibility of recommending that less efficient drivers should be admitted. There is no margin of safety at present, and the Licensing Authority is not, in our view, justified in taking any steps which may increase the number of accidents and fatalities in the streets of the Metropolis. This conclusion, at which we arrive at the outset, obviously narrows the field of our labours. Our problem has reference now only to the question of absolute efficiency. If a disabled man is equal to a sound man, there can be no objection to his admission as a driver. If, on the other hand, motives of sympathy and sentiment should induce the Licensing Authority to admit a man of impaired efficiency—even though the handicap were slight—then, as we have said, he would take a responsibility which we could not recommend. The safety of the public is the first consideration. It seems to us highly important at this point that one fact should not be lost sight of. The driving of public vehicles is incomparably more exacting than the driving of private or even trade vehicles. The driver of a vehicle of the latter classes is able, to a considerable extent, to choose his own routes if not his own times; he is able generally to avoid known centres of congestion and can always stop if he is in a difficulty. The driver of a public vehicle, on the contrary, must proceed by whatever route his employer or his fare directs. His driving is, moreover, for the most part in populous districts where traffic is heavy. This distinction appears to us to be a matter of the first importance." The committee record their opinion "that, having regard to the normal conditions of traffic in the Metropolis, licences to drive motor cabs, motor omnibuses, or tramway cars should not be granted to men who have suffered the loss of an arm, hand, leg, foot, or eye. In the case of injury to one eye, provided the other eye is sound and the injured eye retains fair vision, we think a licence might be granted, each case, of course, being decided on its merits. As regards other minor disabilities, such as loss of one or more fingers, or other damage to the hands, limitation of movements of joints of the upper or lower extremities, or shortening of the lower extremities, and the results of injuries to nerves of limbs, we recommend that the existing practice continue to be followed, and that each case be dealt with on its merits at the discretion of the Commissioner of Police, with, in doubtful cases, a power of reference to a special medical referee."

APPLICATIONS TO THE TRIBUNALS.

Mr. F. Cross, general manager and electrical engineer, Rotherham Corporation Tramways, has reported to his Committee that he cannot advise the employment of women drivers on such difficult routes as there are in Rotherham. That step, he stated, would not conduce to the safety of the public. The report was presented in consequence of the suggestion of the local military Tribunal that women drivers should be employed on one route, the passengers to be required to walk to Westgate instead of entering the cars at College Square. To enable such an arrangement to be arrived at, the Tribunal had exempted several motormen for one month only.

On the ground that he was unable to secure substitutes and that the maintenance of the tramway service was a public need, Mr. R. Birkett, general manager and electrical engineer, Southend Corporation Tramways, appealed for the retention of twelve motormen. The court extended the exemptions to November 1, ordered the men to put in one drill per week with the Volunteer corps, and gave leave to appeal again.

Attempts to Avoid Payment of Fares.—At Newcastle-on-Tyne police court two men were each fined 10*s.* for having attempted to avoid payment of tramcar fares by passing a ticket from one to the other. A similar fine was imposed on a woman who presented an old ticket.

THE PETROL RESTRICTIONS.

Full Allowance Restored to Sheffield Corporation.

The Petrol Control Committee having informed the Sheffield Corporation Tramways department that their supply of petrol for motor omnibuses would be reduced by one-half, Mr. A. R. Fearnley, general manager, informed the committee that the reduction would seriously restrict the conveyance of munition workers and the conveyance of wounded soldiers to hospital. The sequel was seen in a statement made by Sir Wm. Clegg, chairman of the Tramways Committee, at the August meeting of the Corporation. Sir William announced that a representative of the Ministry of Munitions had been in the city during the last few days to inquire about the matter. He had realised the importance of continuing the omnibus service in its entirety, and that day the committee had received an intimation from the Ministry that their petrol would be restored to its usual quantity. The tramways department therefore hoped to be able to resume the whole service on August 11.

Sheffield Electricity Committee applied for a licence for 440 gallons of petrol per month in respect of the cars and lorries used by the electric supply department. In reply they received permits for 776 gallons for four months for the lorries and 84 gallons for three months for the cars. After considering representations made by Mr. S. E. Fedden, the electrical engineer, the Petrol Control Committee replied that arrangements had been made by which all industrial users recommended by the local representative of the Ministry of Munitions would have their requirements fully met.

On August 13 further withdrawals and readjustments were made in eleven more of the services of the London General Omnibus Company. The company hope that it will be possible to maintain the remaining services at their present strength.

Twenty-four thousand owners of motor vehicles neglected to make returns of their petrol requirements during the stipulated period. Applications from them only began to be considered by the Control Committee on August 14.

WOUNDED SOLDIERS' RIDES.

Recent additions to the number of wounded soldiers undergoing hospital treatment have led to numerous suggestions at meetings of local authorities that the men should be given free rides on the tramcars when they are allowed out of hospital. The idea is more strongly supported for the reason that soldiers receive no pay while they are in hospital. Care should be taken, however, that the privilege is only granted under proper restrictions, for Alderman J. Bowes, chairman of Manchester Tramways Committee, has stated that it is in deference to the military authorities that unrestricted free riding is not allowed. The Tramways Committee, he added, have arranged that tokens entitling the holders to free rides will be granted upon application from the proper quarter.

The approved practice is for the hospital authorities to apply to the tramway managers for the passes. At Birmingham wounded soldiers and sailors who regularly attend the out-patient department of a hospital are allowed passes on that particular route. Councillor Harrison Barrow, chairman of the Tramways Committee, stated that the concession is largely made use of, and at a recent meeting of the Corporation he said it was impossible to accept a resolution to allow indiscriminate travelling. The discussion ended by the Council referring the question to the Committee, with power to give such instructions as they thought fit.

Brighton Corporation have refused to grant indiscriminate free riding, and have adopted a recommendation of the Tramways Committee to permit soldiers in hospital uniform to ride free from and to any military hospital except between the hours of 12.30 and 2 p.m. At the end of a month the manager is to report whether the concession has caused any serious interference with traffic.

POWER SUPPLY FOR SHEFFIELD TRAMWAYS.

Owing to the increased cost of coal and materials the City Council were asked on August 9, by the Electricity Committee, to sanction increased charges, which would bring in an additional £35,801 in revenue during the next six months on an estimated sale of 120 million units. Of the increase £7,000 would be received from the Tramways Committee. Councillor Evans, chairman of the Electricity Committee, stated that 109 electric power undertakings had increased their charges during the war. What would have happened to the city tramways to-day had it not been for the fact that some time ago the Electric Supply Committee coup'ed up Neepsend with Kelham Island? It would have meant a very large increase in the plant there, probably at a cost of £70,000 or £80,000, to enable them to drive the cars which were being used to-day. Alderman Fenton moved an amendment that the increased charge to the Tramways Committee be referred to the two committees for consideration and report. The Tramways Committee should be consulted, with a view to arriving at an amicable agreement. The present price of 8*d.* per unit was fixed for a period of three years from September 29, 1914. It was more than the average, which for the past year was .71*d.* Councillor Evans explained that the power supplied to the tramways from Neepsend was more costly to produce because it had to be converted into alternating current at Kelham Island. This applied to six and a half million units, and the conversion increased the cost by ten per cent. Councillor Stembridge said the Tramways Committee agreed to pay more than the average price because of this fact. Sir Wm. Clegg, chairman of the Tramways Committee, said he was prepared to consider favourably a revision of the terms, but the present terms when arranged were exceedingly generous. Under the agreement, the Tramways Committee had paid £9,000 more than if they had retained control of their own station. The amendment was lost by twenty-five votes to twenty-two, and the increased charges were sanctioned.

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MISCELLANEOUS NEWS AND NOTES.

The "Flying" Train Project.—The Bachelet Levitated Railway Syndicate, Ltd., and the Bachelet Flying Train Syndicate, Ltd., are being wound up voluntarily.

Keighley Railless Trolley Scheme.—A year's extension has been granted to Keighley Corporation for the completion of the overhead equipment of the remaining railless trolley route authorised under the Act of 1912.

Douglas Cable Cars.—In consequence of the cable now in use on the cable tramway not having come up to the Tramways Committee's expectations, the makers have agreed to allow a substantial reduction in price when a new one is ordered.

Electric Trains Stopped by a Flood.—On August 14 a heavy downfall of rain caused a great flood near the Liverpool end of the Southport electric railway (third rail) and the trains from that point had to be drawn by steam engines.

The War Promotes Dinner-Hour Traffic.—The annual report of Exeter Tramways department states that the dinner hour service is now more appreciated, as a large number of shops are closed for that period. The average number of tickets issued is 950 per day.

Treats for Children.—Poor children in Manchester are being entertained at treats at open spaces under the auspices of the Education, Parks and Tramways Committee. The latter department transports the youngsters to the number of over 2,000 a time.

Oil Stain on the Back of Tunics.—At Portsmouth attention has been called to the oil stain on the lower part of the back of the male conductors' tunics. It is caused by the men resting against the place where the hand brake is oiled. The manager proposes to fit a wire guard to the position.

The Provision of Jacks.—At an inquest on a child who rolled off the tray of a lifeguard on a Blackpool tramcar and was fatally injured the jury suggested that the Corporation should "provide some better means of securing jacks to raise cars in case of accident." A type of jack very suitable for the purpose was described and illustrated in our issue of August 10.

A Sensible Decision.—Gateshead Tramways Company have reaped the reward of their refusal of a request by the Town Council to pave the strips of roadway and channels of the section of the Bensham route that the company are about to double. The Corporation have now withdrawn that condition attached to their consent to the doubling.

Profitable Sale of Wheels.—On the recommendation of the general manager and engineer, Oldham Tramways Committee have sold a number of chilled-steel car wheels at £1 more than the price at which they were purchased. In explaining the sale to the Council the chairman said the manager did not care for these wheels and that there was no likelihood of him requiring them.

Sheffield Service Partly Suspended. There was a temporary suspension of the tramway service for just over an hour at midday on August 12 on all but the eastern routes. The stoppage was due to the necessity for remedying faults that had developed at the generating station owing to the strain of the extra load entailed during the past two years. New plant is being installed to meet the increased requirements.

Insufficiency of Cars at Aberdeen.—On the termination of the war the Corporation Tramways Committee will require a large number of new cars, according to the annual statement of their chairman. During the past year the cars ran 59,605 additional miles, and the manager is now running practically the whole of the stock at rush times and on Saturdays. At present he can see no prospect of obtaining any more cars.

L.C.C. Tramway Acts.—The powers obtained for the construction of certain tramways authorised by the London County Council (Tramways and Improvements) Acts, 1903, 1909, and 1910, which have not yet been commenced, will expire in August, 1917, and the Council have adopted the Highways Committee's recommendation that an extension of time should be sought under the provisions of the Special Acts (Extensions of Time) Act, 1915.

Responsibility of a Pedestrian with One Eye.—A labourer who is blind in the right eye on August 11 sued Sheffield Corporation for £10 damages for injuries sustained through being knocked down by a tramcar. The County Court judge held that there was no negligence on the part of the motorman, and gave judgment for the defendants. The fact that plaintiff was blind in the right eye did not cast any duty upon other people to exercise any extra care, but it cast upon plaintiff the duty to look round sufficiently for his left eye to see if there was anything coming.

South Metropolitan Fare Revision.—Although on through-riding sections of the South Metropolitan Tramways the fares have been raised to correspond with the increases on the Croydon Corporation Tramways, the concessions that the company has been in the habit of giving remain. The return passenger on the Sutton and Tooting routes instead of paying 3½*d.* or 4*d.* each way continues to have the opportunity of buying a 6*d.* return ticket, or a weekly ticket over the whole of one of these routes for 2*s.* 3*d.* a week, or over half the route for 1*s.* 6*d.* Children under fourteen can still travel over the higher value stages for half-fares.

Hon. A. Stanley's Appeal for Russian Ambulances.—As chairman of the Royal Automobile Club the Hon. Arthur Stanley, M.P., has received an appeal from the Russian Red Cross Society for several motor ambulance cars. As the result of the Club's appeal in September last ambulances were sent to the Russian forces in Persia and Asia Minor. Mr. Stanley states that if the much needed ambulances are to be used by our splendid Russian Allies during the coming winter they should be despatched as soon as possible, and he asks that donations should be sent to the Secretary, Royal A.C., Pall Mall, London, S.W.

Lamps and Spares for Johannesburg.—The controller of stores, Johannesburg Council, has called for tenders by noon on September 4 for the supply and delivery of 10,000 drawn-wire metallic-filament traction lamps and ten miles of lightly insulated wire for outdoor use. Tenders are also to be received, up to noon on September 1, for the supply and delivery of tramcar spares. Specifications and forms of tender may be consulted at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall Street, London, E.C.

Conditions Imposed on War Office Contractors.—It was stated at a meeting of the London branch of the National Leather Goods Manufacturers' Association that firms in the trade submitting tenders to the War Office were now required to supply a number of particulars, as follows:—Material cost in detail; labour cost in detail; standing and all other charges; estimated profit; tender price; turnover for the two years ending in 1915 and 1913 respectively; net profit for the year ending 1913; and the names of the tanner, currier, and suppliers of the leather. The Association decided to recommend its members to supply the particulars asked for except figures as to turnover and profits.

Car Lighting and Air Raids.—An alteration in the lighting of the interior of the cars has been made by Birmingham Corporation tramways department. Hitherto the blinds have been drawn and the lamps were fitted with cardboard shades. Under the new arrangement the blinds remain down but the shades to the lamps are of metal, thus confining the light to a limited area. On the top deck of covered cars the shades deflect the light of the two lamps upwards. There are no blinds to the upstairs windows. The windows of the top saloons of the Liverpool cars are painted black and are kept closed at night in order to comply with the lighting restrictions. Although passengers are able to read with the amount of light allowed in the cars, they suffer the disadvantage of a close atmosphere during the hot weather.

Employees' Applications.—Councillor Montgomery, chairman of Glasgow Tramways Committee, on August 10 asked the Corporation to adjourn until the next meeting the consideration of the Committee's recommendation to allow the motormen and conductors to work fifty-seven instead of fifty-one hours per week. The recommendation was put forward in lieu of granting an application for a bonus of 6*s.* per week. Leicester Tramways employees have applied for an increase of wages that would involve an outlay of £7,000. Alderman Flint, chairman of the Committee, informed the Council that the Committee were already paying £14,000 by way of advances on pre-war wages, and the Corporation have adopted his suggestion that the question of the wages of the whole of the municipal workmen should be considered. A special committee was appointed for that purpose.

Passenger Barriers and Trailers.—In order to abate the scramble to board cars for Monifieth in the High Street, Dundee Tramways Committee have instructed their chairman and the general manager to consult with the chief constable as to the erection of a movable barrier so that intending passengers will have to form into a queue. During the discussion of the subject a member suggested the erection of a kiosk round one of the tramway standards for the giving out of change. Mr. Peter Fisher, general manager, pointed out that the latest idea in that connection was that the conductors in Glasgow were instructed to take nothing but copper. Bailie Buist raised the question of trailers, and Mr. Fisher observed that in the steam car era trailers resulted in a number of accidents. Anyone who slipped off the first car was, as a rule, run over by the trailer. It may be remarked that this danger is non-existent with the modern trailer system in use in London.

Women Conductors.—Rapid progress has been made with the work of attaching seats for women conductors to the side of the staircases on the Manchester tramcars. When not in use the seat springs back to the side of the steps. Mr. J. M. McElroy, the general manager, states that on the slack return runs a little rest will be worth a great deal to a woman. There was a discussion at Portsmouth Council meeting on the question of the compulsory use of puttees by the women conductors. Councillor J. Timpson, chairman of the Tramways Committee, said he believed that during the hot weather the girls did suffer to some extent from the puttees, but they had already been provided with gaiters at 8*s.* 9*d.* per pair. Some of the girls would not put the buttons back where necessary to make them fit. At first they were allowed to dress as they liked, and there were remarks about their open-necked blouses. Councillor Stobie said the manager at one time had to continually find fault with the girls' boots. Some would wear shoes and some boots, while others wore open-worked stockings. The consequence was that the committee decided to require them all to wear puttees, as at Southampton. Mr. P. Peddie, hackney carriage inspector to Edinburgh Corporation, has reported that, up to April 5, the number of women licensed as car and omnibus conductors was 227. They had discharged their duties to the satisfaction of the public and with credit to themselves. Rhondda Tramways Company employs eighty women conductors. For their summer headdress the Liverpool women conductors have been provided with a white straw hat with a dark-coloured ribbon on which the badge is reproduced. The shape of the hat is something between a sailor and a panama. Aberdeen tramways department now employs 118 women, of whom 107 are conductors, one is an inspector, and ten are clerks. The chairman of the Tramways Committee states that the department was very well pleased with the work of the women. They had come at a time when their services were very valuable. The total number of tramway employees who had joined the services was 165. This was sixty-five per cent. of the male staff, and he believed this was one of the largest percentages obtaining in any tramway undertaking in the country. They regretted that six of their men had died while serving.

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PERSONAL.

Mr. J. Carruthers, who was described in a paragraph in our last issue as permanent-way engineer to West Ham Corporation, should have been referred to as engineering assistant to the general manager of the tramways department who is now responsible for the permanent way.

2nd Lieut. Lycett, who has died from wounds sustained in France, was a young engineer connected with the firm of Tilling-Stevens, Ltd., by whom his services were greatly appreciated. Mr. Lycett was the son of Mr. J. A. Lycett, a member of the Council of the British Electrical Federation, Ltd., and managing director of several of the affiliated electric traction companies.

Mr. J. Brierley, traffic superintendent, and **Mr. J. W. Thorpe,** works manager, Oldham Corporation Tramways, have received recognition from the Council of the services they rendered during the three months preceding the appointment of Mr. P. Priestly as general manager and engineer. Both officers have been awarded an increase of salary, and Mr. Brierley also received an honorarium. The recommendations were made by Mr. Priestly, and Alderman Isherwood informed the Corporation that the two gentlemen had had very serious difficulties to face on account of the shortage of labour at the sheds, and they had put in a great deal of extra time and given extra services. Even with the advances recommended they would be still below the salaries paid in other towns of approximately the same size as Oldham.

CONTRACTS AND ORDERS.

British Westinghouse Company are supplying a rotary converter to Barrow Council.

Sunderland Council have placed a contract with the British Insulated and Helsby Cables, Ltd., for a supply of cables.

Edison and Swan Company, Ltd. have a contract for the supply of metal-filament lamps to Melbourne City Council.

Aberdeen Council have placed a contract with C. A. Parsons and Company, Ltd., for a 5,000-kw turbo-generator set, at £18,000.

Sheffield Electricity Committee have accepted the offer of the British Electric Transformer Company Ltd. to extend their contract for two years.

Dover Council have agreed to purchase a sixth Edison battery vehicle for the collection of house refuse, for street watering, and sweeping, and for the emptying of catch pits. In a report prepared by the borough engineer the opinion was expressed that the use of the electric vehicles at night would result in a saving of from £500 to £700 per annum.

Rochdale Corporation have accepted the tender of Shepherd's Parging Block Company, Ltd., of Rochdale, for a quantity of block parging for use in connection with repairs of tramway track. These blocks prevent bedding from being squeezed out from under the paving and up into the cavities of the rail, thus letting down the set. The block paving is, in fact, just a simple and effective way of filling the space between the base and the head of the rail.

Aberdeen Clothing Contract.—The Tramways Committee have accepted the following tenders for the supply of employees' uniforms:—Inspectors', motormen's, conductors', and parcel boys' tunics and trousers, Anderson and Thomson, Aberdeen; overcoats for inspectors, motormen, and conductors, Moore, Taggart and Co., Glasgow; waterproofs for inspectors and motormen, London Rubber Co., Aberdeen; caps, Army and Navy Stores, London.

Manchester Corporation have approved of the following tenders recommended for acceptance by the Electricity Committee:—Ferranti (Ltd.), and British Electric Transformer Company, transformers; W. T. Glover and Co., paper-insulated cables; General Electric Co., electrical accessories; British Thomson-Houston Co., metal, carbon, and radiator lamps; Doulton and Co., cable protectors; W. T. Glover and Co., diatrine sleeves and paper tape; W. T. Henley's Telegraph Works Co., bitumen and linen tape; C. Macintosh and Co., rubber strip, flexible cables; Callender's Cable and Construction Co., box compound, bittite tape, and resin oil.

FINANCIAL REPORTS AND MEETINGS.

Waste Heat and Gas Electrical Generating Stations Company.—The directors announce an interim dividend of two and one half per cent.

Montreal Tramways.—The Board of the Montreal Tramways Company announce a quarterly dividend of two and one half per cent. making ten per cent. for the year ended June 30.

Egyptian Delta Light Railways.—The receipts for the year ended March 31 amounted to £192,801, and the net revenue was £69,408, while interest and dividends earned totalled £3,501. Net profits on the working of the Helouan line were £2,070, and £32,295 was brought forward, giving a total of £107,335. In view of the unprecedented conditions prevailing in Egypt and the financial uncertainty of the future, the directors are unable to recommend a dividend.

Guest, Keen and Nettlefolds, Limited.—The directors announce that at the annual meeting, which is fixed to take place on August 31, they will recommend the payment of final dividends as follows:—On preference shares at the rate of five per cent. per annum for the half-year ended June 30, and on ordinary shares at the rate of ten per cent. per annum, for the half-year ended June 30, together with a bonus of one shilling per share on ordinary shares, all free of income tax. Similar distributions to the foregoing have been made for many years.

Dublin and Blessington Steam Tramways.—The report for half-year to June 30 shows gross receipts £3,066; expenses £6,443; and net loss for six months, £3,378, against £1,097, loss for the corresponding half-year. Large increases in expenditure have been caused by the fact that the reconstruction of the company's plant is necessary. Owing to a previous decision of the arbitrators appointed by the Board of Trade, the directors have always been prevented from setting aside any reserve for renewals or depreciation, with the result that very heavy expenditure has become necessary during the past half-year. There were 10,000 fewer passengers. The net loss is debited in equal shares to the County Councils of Dublin and Wicklow. The guaranteed dividend for the last two half-years is shown in the accounts as unpaid.

Tyneside Tramways and Tramroads Company.—In their half-yearly report the directors state that the surplus of receipts over expenses is £4,129, which, with the balance brought forward (£625) makes a total to the credit of profit and loss account of £4,755. After deducting interest on debentures, loans, etc., amounting to £1,013, there remains an available balance of £3,742. This profit the directors propose to appropriate as follows:—Dividend on the preference shares at the rate of five per cent. per annum, less income tax, £601; dividend on ordinary shares at the rate of one and three-quarters per cent. per annum, less income tax, £1,172; reserve for renewals, depreciation, and other contingencies, £939 (this, with £435 interest on investments, will increase the fund to £23,936); reduction of registration and formation expenses, etc., £330; leaving to be carried forward, £700. The traffic receipts show a decrease of £1,017 14s., as compared with the corresponding period of last year; due to the loss of pleasure traffic.

BUSINESS NOTES.

The popularity of the products of Messrs. George Spencer, Moulton & Co. among municipal and other users should be widely extended as the result of the issue of the company's new catalogue, No. 101. To say that every owner and driver stands to gain by perusing the information given therein is no exaggeration. One of the novelties is a dozen cut-outs showing the exact sizes of a section of each tire (European sizes in millimetres and American in inches), so that the user can judge instantly and accurately what will suit his needs, according to whether his vehicle is British or American. Owners of vehicles shod with steel tires will be interested in a page that contains reasons why rubber tires should be substituted.

A remarkable feature about Ferodo fabrics is their adaptability. Although designed originally for lining clutches and brakes, their high co-efficient of friction results in their being used in many ways. The latest instance comes from a firm who are extensively engaged on munitions. They are using Ferodo fibre in a circular vice for holding the shells whilst screwing in the noses, and they inform the makers that it gives good results, as it does not mark the work and has a remarkable gripping power. The manufacturers of Ferodo fabrics, the Herbert Frood Company, Ltd., Chapel-en-le-Frith, are at all times ready to give advice in regard to the use of their fabrics, and welcome inquiries.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-four of the principal tramway undertakings in the United Kingdom for the week ended August 5, give total receipts of £204,222, or £9,484 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or sixty-nine more than for the corresponding week. The receipts this year were at the rate of £91 11s. 7d. per mile of single track, and last year at the rate of £90 2s. 3d., thus showing an increase for the week of £1 9s. 4d. per mile open. This week compares with the bank-holiday week of last year, and it is notable that notwithstanding this fact, a small increase is shown in the return. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

Edison Swan Electric Company.—The name of the Edison and Swan United Electric Light Company, Limited, of 123-125, Queen Victoria Street, E.C., and Ponders End, etc., has been changed to the Edison Swan Electric Company, Limited.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27, 1914	Cash. Aug. 17.	A Week Ago.
5%	5%	Alabama Traction. 5% 1st. Mt.	—	67	69½	69½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4¾	75/-	76/3
4%	4%	Do. 4% Deb. ...	100	91	75½	75½
4½%	4½%	Do. 4½% Deb. ...	100	98½	76	76
5%	5%	Do. 5% Deb. ...	100	96	76½	76½
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1⅝	20/6	20/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	94	94
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅜	10⅜	10¾xd
4½%	4½%	Do. 4½% Deb....	100	96	83	83
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	92	92
$1	$1	Brazilian Trac. & Power Ord....	$100	66	62	61⅛
$1½	$1½	Do. 6% Cum. Pref.	$100	97	93⅜	94½
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6½	6 25/32
2/6	2/6	Do. 5% Cum. Pref.	5	5	85/-	85/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	93	92½
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	40 1/8	40 1/8
5%	5%	Do. Pref. Ord....	100	106	48	47
5%	5%	Do. 5% Cum. Pref.	100	103	66½	65
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	80½	80½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	67	65
—	—	Brit. Elec. Trac. Ord.	100	—	36½	35½
—	—	Do. 6% Cum. Part Pref. ...	100	—	80½	80½
5%	5%	Do. 5% Deb.	100	92	85	85
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	70	70
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	92½	92½
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	6⅜	6⅜
1/3	1/3	City of B.A. Trams.	5	5½	91/10xd	91/10½
5/-	4/-	Dublin United Trys 6% Pref.	10	12	10⅞	10⅞
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	½	2/1½	2/1½
5/6	6/-	Lanarkshire Trys. Co.	10	10½	9 3/32	9 3/32
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81½	81
9¾d.	9¾d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	1⅛	2/3	2/3
6d.	6d.	Do. 5% Pref.	1	⅛	8/7½xd	8/7½
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	59½	59½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88½	88½
5%	5%	Do. 5% Inc. Deb.	100	88½	82½xd	82
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	48	46½
3/-	3/-	Madras Elec. 6% Pref. ...	5	5⅛	96/6	96/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	67½	67½
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	70½	70
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	79½	79½
$1½	$1½	Mexico Trams. Common ...	$100	70	27⅜	27⅜
5%	5%	Do. 1 Mt. 5% G.B.	—	84	40½	40½
6%	6%	Do. 6% Mt. Bds.	100	76	34	34
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	96½	96½xd
4½%	4½%	Do. 4½% Stg. Debs.	100	99	94	94
1/2*	1/2*	National Steam Car	1	⅛	19/10½	21/3
9¾d.*	9¾d.*	New General Traction	1	⅛	7/9	7/9
6d.	8¾d.	Northern Gen. Trans. Ord. ...	1	⅛	16/-	16/-
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	66/-	66/-
5%	5%	Do. 5% 1st Deb.	100	89½	74½	73½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80½xd	80½xd
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	⅛	11/3xd	11/3
8d.	10d.	Provincial Trams. Ord.	1	⅛	16/6	16/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84	84
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	91½	91⅞
5%	5%	1st. Mt. 5% 50 yr.	100	89½	82½	82½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	90½	90½
5%	5%	Do. 5% Perp. Deb.	100	99½	82½	81⅞
—	—	Singapore Elec. Trams	5/-	½	4/10½	4/10½
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	96½	96½xd
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	85	85
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	92½	92½
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	78½	78½
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅛	9/3	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	90/-	90/-
		Metropolitan Dist. Ord. ...	100	21½	18½	18⅜
		Undgd. Elec. Rys. of London ...	10	2½	40/-	39/4½
		Do. "A"	1/-	⅜	6/0⅜	6/3
		Do. 4½% Bds of 1933 Rd.	—	99	102½	102
		Do. 6% 1st Cum. In. Db.	100	114	107½	107½
		Do. 6% In. Bonds Rd. ...	—	88	91 7/8	

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1915	Latest Return. 1916	Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	Aug. 12	£50,848	£48,752	33	£1,626,630 —	£7,245
Auckland.....(28 days)	July 28	20,408	21,507	4	21,507 —	646
Ballarat and Bendigo ...	June 18	2,692	2,793	12	10,375 +	878
Brazilian Traction Mlrs.	June	6,591,940	6,961,000	26	39,950,000 +	2,265,890
Brisbane	Apr.	29,890	32,575	18	129,450 +	12,610
British Columbia.....$	June	498,093	529,078	52	6,602,624 —	703,939
Buenos Aires Lacroze ...	July 1	41,460	38,439	5	38,439 —	8,021
Burmah Tramway ... Rs.	July 29	3,726	3,437	52	... +	3,920
Calcutta.....Rs.	Aug. 12	66,307	69,547	33	2,161,309 +	102,224
Cape Town	July	...	13,357	...	...	...
Carthagena & Herrerias..	July 30	2,157	2,371	31	18,740 +	5,935
Cordoba	May	14,494	14,868	9	28,921 +	818
East India	July	2,231	2,220	52	25,370 +	1,586
Hong Kong .....$	July 8	10,429	15,124	30	370,750 +	83,182
Kalgoorlie	May	3,269	2,921	21	12,437 —	1,035
La Plata	July	4,054	3,909	31	29,835 +	15
Lima	Apr.	31,623	33,556	18	134,629 +	5,614
Lisbon .....Escu.	June	...	202,451	...	...	...
Madras .....(2 weeks)	Aug. 15	30,869	32,269	33	469,380 +	33,100
Manila .....$	Apr.	117,450	124,350	...	505,381 +	16,765
Manaos .....Rs.	May	...	152,554	...	...	...
Melbourne	May	...	69,275	...	...	...
Montevideo	July	25,161	25,220	30	266,288 +	14,435
Pernambuco	Aug. 13	2,902	3,140	32½	95,373 —	4,885
Peruvian .....$	July	724,838	835,430	5	835,430 +	110,592
Port Elizabeth	July	...	3,166	...	...	...
Rangoon	July	4,629	4,357	31	32,938 —	1,436
Shanghai .....$	June 19	26,314	29,017	...	...	...
Singapore.....$	July 8	11,604	12,726	27	334,873 +	37,221
Toronto.....$	June	787,558	884,491	26	5,335,199 +	525,136
Winnipeg	June	255,549	254,686	26	1,701,474 —	50,782

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Name.	Week ended	Latest Return. 1915	Latest Return. 1916	Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Incr. or Dec.
Aberdare U.D.C.	Aug. 8	£290	£436	+ 156	19	£7,277	+ £650
Aberdeen Corporation...	" 9	1,878	2,232	+ 354	10	19,701	+ 483
Accrington Corp.	" 9	559	631	+ 72	19	11,109	+ 285
Ayr Corporation	" 12	526	773	+ 247	13	6,524	— 6
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	" 13	1,419	1,699	+ 280	19½	29,694	+ 2,580
Birmingham Corp.	" 12	14,383	17,394	+ 3,010	19	315,903	+ 53,967
Do. Motor Omnibuses	" 12	907	1,405	+ 497	19	19,119	+ 2,545
Blackburn Corp.	" 9	1,307	1,391	+ 84	19½	25,807	— 1,034
Blackpool & Fleetwood.	" 12	2,343	2,652	+ 309	32	23,901	+ 1,451
Blackpool Corp.	" 10	4,390	5,541	+ 1,151	19	40,209	+ 6,096
Bolton Corporation	" 13	2,657	3,076	+ 419	20	56,694	+ 2,486
Bournemouth Corp.	" 19	2,859	3,350	+ 491	20	47,118	+ 2,372
Bradford Corporation	" 12	6,579	7,294	+ 715	19	132,305	+ 985
Brighton Corporation	" 13	1,577	2,093	+ 516	19½	24,795	+ 1,880
Bristol	" 11	10,406	12,902	+ 2,496	32	317,623	+ 12,399
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation	" 12	1,590	1,740	+ 150	20	34,298	+ 1,445
Burton-on-Trent Corp...	" 13	311	323	+ 12	19	5,202	— 596
Bury Corporation	" 6	1,423	1,560	— 137	19½	27,086	+ 1,017
Cardiff Corporation	July 22	2,828	3,139	+ 311	16	47,494	+ 2,745
Chatham & District	Aug. 10	1,390	1,668	+ 278	32	38,143	+ 1,457
Chesterfield Corp.	" 10	280	320	+ 40	19	5,443	+ 184
Colne Corporation	" 24	234	264	+ 30	...	...	...
Cork Electric	Aug. 10	560	650	+ 90	32	16,041	+ 122
Croydon Corporation	Apr. 28	1,726	1,403	— 323	4	5,417	— 666
Derby Corporation	Aug. 12	1,150	1,347	+ 197	19½	22,116	+ 1,144
Dover Corporation	*	...	...	...	...	...	...
Dublin & Lucan	" 11	151	219	+ 68	6	1,191	+ 145
Dublin United	" 11	6,215	7,820	+ 1,605	32	188,763	— 5,059
Dundee City	" 9	1,334	1,573	+ 239	12⅜	17,424	+ 401
East Ham Corporation	" 12	1,320	1,445	+ 125	19½	25,771	+ 64
Exeter Corporation	" 11	449	511	+ 62	19	7,646	+ 25
Glasgow Corporation	" 12	21,415	24,110	+ 2,695	10⅜	245,289	+ 21,786
Glasgow Subway	" 12	935	976	+ 41	32	37,100	+ 3,857
Glossop (U. Elec. Supp.)	" 12	135	154	+ 19	33	4,495	+ 479
Halifax Corporation	" 8	2,532	2,647	+ 115	18½	43,122	— 12
Do. Motor Omnibuses	" 8	71	59	— 12	18½	909	— 83
Hastings & District	" 11	1,621	2,082	+ 461	32	30,947	+ 1,143
Huddersfield Corp.	" 12	2,927	3,357	+ 430	19	57,374	+ 4,890
Hull Corporation	" 12	2,931	3,444	+ 512	19	60,415	+ 560
Ilford U.D.C.	" 12	688	799	+ 111	17	13,818	+ 671
Ilkeston Corporation	" 9	141	167	+ 26	19	2,643	+ 102
Ipswich Corporation	" 12	708	669	— 39	19	10,688	— 206
Isle of Thanet	" 12	1,042	1,023	— 19	45	14,666	— 2,790
Kilmarnock Corp.	" 12	160	180	+ 20	12⅜	2,264	— 60
Lanarkshire	" 10	2,103	2,773	+ 670	32	72,374	+ 11,302
Lancashire United	" 9	1,739	2,328	+ 589	32	56,665	+ 2,018
Leeds City	" 12	8,574	11,232	+ 2,658	20	191,135	+ 16,235
Leicester Corporation	*	...	...	...	...	...	...
Leith Corporation	" 12	774	999	+ 225	12⅜	11,534	+ 1,287
Leyton U.D.C.	" 10	1,668	2,120	+ 452	19	32,495	+ 599
Liverpool Corporation	" 12	13,542	16,286	+ 2,744	32½	448,142	+ 21,533
Llandudno & Colwyn B.	" 4	805	643	— 162	35½	10,581	— 375
London County Council	July 19	46,999	48,584	+ 1,585	15½	755,622	+ 98,068
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation...	*	...	...	...	...	...	...
Maidstone Corporation..	Aug. 10	253	261	+ 8	19	4,208	— 162
Manchester Corp.	" 12	17,693	20,134	+ 2,441	19	367,745	+ 40,603
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	July 29	230	258	+ 28	17½	3,744	+ 280
N'castle-on-Tyne Corp.	" 5	6,572	7,322	+ 750	19	120,038	+ 5,405
Newport (Mon.) Corp....	Aug. 12	881	1,166	+ 285	19	18,090	+ 1,415
New St. Helens & Dist.	" 9	1,093	1,661	+ 568	6	7,161	+ 221
Northampton Corp.	" 11	736	928	+ 192	19	13,586	— 1,461
Nottingham Corp.	" 10	3,663	4,444	+ 781	19	73,892	+ 921
Oldham Corporation	" 13	2,324	2,614	+ 290	22	51,450	+ 3,326
Portsmouth Corp.	" 12	3,171	3,807	+ 636	20	55,103	...
Preston Corporation	" 9	1,082	1,120	+ 38	18⅜	20,485	+ 2,006
Provincial	" 12	2,855	3,309	+ 454	45	101,606	+ 5,448
Reading Corporation	" 10	894	1,001	+ 107	18⅜	15,909	+ 600
Rhondda Tramways	July 27	1,134	1,428	+ 284	30	37,077	+ 2,398
Rochdale Corporation	Aug. 12	1,791	1,946	+ 155	19½	35,573	+ 1,186
Rotherham Corp.	" 16	1,236	1,705	+ 469	19⅜	29,747	+ 6,922
Salford Corporation	" 14	5,316	5,814	+ 682	19⅜	109,377	+ 6,240
Sheffield Corporation	" 13	9,037	11,177	+ 2,139	20½	210,996	+ 34,462
Southampton Corp.	" 9	1,715	1,986	+ 271	18⅜	30,976	+ 2,306
Southend-on-Sea Corp...	" 9	1,415	2,024	+ 609	19	17,806	+ 683
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	" 12	868	1,018	+ 150	19½	16,146	+ 542
Sunderland Corp.	" 13	1,667	2,003	+ 336	19	31,858	+ 1,907
Sunderland District...	" 9	657	833	+ 176	41	24,524	+ 1,421
Swindon Corporation	July 26	199	216	+ 17	16⅜	3,337	— 7
Torquay Tramways	Aug. 3	782	863	+ 81	31	16,408	+ 611
Tyneside Trys. & Tmrds.	" 2	811	807	— 3	5	3,520	+ 79
Wallasey Corporation	" 12	1,475	2,004	+ 529	19½	27,510	+ 1,141
Walsall Corporation	" 12	789	1,050	+ 261	33	26,211	+ 2,727
Walthamstow U.D.C.	" 12	1,002	1,551	+ 549	19	21,881	+ 3,209
Warrington Corp.	" 10	459	535	+ 76	19	9,252	+ 642
West Ham Corporation	" 10	3,096	3,567	+ 471	18⅜	62,420	+ 2,700
Wigan Corporation	" 10	1,490	1,991	+ 501	19	31,978	+ 2,707
Wolverhampton Corp.	*	...	...	...	...	...	...
Yorkshire (W. Riding)...	" 13	1,608	2,192	+ 584	33	57,205	+ 5,041

* Issue of Traffic Returns suspended during the War.

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

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Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

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TO ELECTRICAL CONTRACTORS.

The Directors are prepared to receive tenders for Electric Battery Materials for Carriage Lighting.

Copies of the Specification may be obtained from the Secretary.

Tenders should be delivered, under sealed cover, endorsed, "Tender for Train Lighting Material," to the undersigned, not later than 10 a.m. on Wednesday, September 6, 1916.

The Directors do not bind themselves to accept the lowest or any tender.

T. MORRISON,
Secretary.

Secretary's Office,
Amiens Street Terminus, Dublin.
August 23, 1916.

BOROUGH OF CAMBRIDGE.

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By order,

Guildhall, Cambridge. J. E. L. WHITEHEAD,
August 14, 1916. Town Clerk

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The directors do not bind themselves to accept the lowest or any tender.

T. MORRISON,
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SAM FAY, General Manager.

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SATURDAY, AUGUST 26, 1916.

THE TRAILER QUESTION.

Replying to a suggestion put forward at the August meeting of Sunderland Corporation that trailers should be used, Councillor G. New, chairman of the Tramways Committee, said the matter had been considered on many occasions, but the Committee were not in favour of it. In view of this expression of opinion it may be hoped that delegates to the Municipal Tramways Conference next month will take the opportunity of inspecting the trailer traffic on the southern portion of the London County Council's tramways. Local considerations must guide any tramway authority in adopting trailers elsewhere, but in London the trailers have been found of untold value at this period of shortage of motormen. Trailers are in use on four routes, and there has not been any suggestion that they are an obstruction, although on each of the routes there is strenuous competition from omnibuses. Two methods of shunting are adopted. When the terminus is level the trailer is left at the entrance to a crossing, over which a motor car will come from the adjoining line and pull the trailer back with it. At the London and Croydon termini the metals of the former are on a slight gradient until the Croydon boundary is reached. The system adopted here is for an incoming car to drop its own trailer and to couple up with one standing in front, pushing it over the crossing to the end of the line, the conductor on the trailer holding off the automatic brake by applying a lever on the platform. When loaded up the two vehicles proceed together. Meanwhile the trailer dropped by this motor car has been coupled to a later car in readiness for going through the same movement. The only matter for regret is that the cars cannot run through to Croydon owing to the disinclination of the Corporation to render their track capable of taking the extra traffic. When the war is over, however, arrangements will be made for through running of L.C.C. cars and trailers over the London United Company's track to Kingston, Hampton Court, and other places in the Thames Valley. The company obtained powers for that purpose two years ago, with the support of the County Council. An outcome of that arrangement is that the L.C.C. cars bear prominent announcements calling attention to the facilities for reaching Hampton Court by changing at Tooting. Perhaps the best indication of the value of trailer cars to London is to be found in the fact that in October last the Board of Trade agreed to them being run during the period of the war at all times of the day on the authorised routes. Previously the trailers were only used at periods of rush traffic. It is understood that special facilities were granted to the car builders to deliver as many as possible of the 150 trailers ordered by the Council. At the present time there must be considerably over a hundred trailers in service.

APPLICATIONS TO TRIBUNALS.

Aberdeen Corporation Tramways department appears to be in a fortunate position as regards the supply of motormen. Applications for exemption were made on August 17 by three motormen on their own account. The military representative opposed the applications, stating that Mr. Pilcher, the general manager, had given him authority to state that he did not desire to retain men of military age. Up to the present he had a waiting list for employees, and was able to fill the places of such men at any time. A solicitor who represented the three men, asked that they should be exempted as being in a certified occupation. One man was forty years of age, and he also claimed exemption on conscientious grounds. The Tribunal refused the applications, but ordered that the men should not be called up until August 31.

The Blackpool Tribunal has granted temporary and conditional exemptions to a number of men who were appealed for by Mr. C. Furness, general manager of the tramways and borough electrical engineer. One was described as the chief fitter in repair and maintenance work for the tramways. Temporary exemption had already been granted to the foreman of the permanent way gang, and leave was given for a further appeal to be made for the retention of his services until the end of the season. Mr. Furness stated that within the next two weeks twenty motormen were going from the department, and if the other men were also taken he would have to withdraw more than fifteen cars from a service that was maintained with difficulty.

Every man of military age in the employment of the Torquay Tramways Company, Limited, attested voluntarily before there was any thought of the Military Service Act. The only men whom the manager, Mr. H. J. Nisbett, now retains of the original staff are those who have been rejected as unfit and two for whom he has obtained exemption.

Conditional exemption has been allowed to two motormen and an electrician employed by Accrington Corporation Tramways Department.

Exemption certificates were granted on August 19 in respect to five men employed by Leicester Corporation Tramways department.

Aldershot and District Traction Company have failed to secure exemption for two fitters.

TRACK MAINTENANCE DURING THE WAR.

Owing to the number of the employees on the Sunderland Corporation tramways department who have joined the colours, certain portions of the track have lately shown a need for repairs. The chairman of the committee has replied to a complaint by stating that the engineer is doing his best with the material and men at his disposal to keep the permanent way in something like good condition.

At Plymouth, Alderman S. H. Phillips, chairman of the Tramways Committee, informed the Council at their August meeting that he was bound to admit the service, especially in the Devonport area, was not as good as could be wished. It was the old question of the condition of the cars and the track. The surveyor was doing all he could, with the limited number of men he could obtain, to adapt the cars as required and keep the lines in decent repair. The staff of the manager were almost overworked in their efforts to keep the cars running in a condition that would prevent really serious accidents.

Mr. G. F. Craven, general manager and electrical engineer, Reading Corporation Tramways, has put down four complete sets of new points during the past three months, and five more sets are now being installed. The nine sets were purchased under a contract made in April, 1914. Mr. Craven has reported that many of the old points now in use are in need of attention, and he has been authorised to continue renewing defective points and mates to the number of eighteen. At present he is able to purchase points and mates at the same price as before, owing to the favourable contract then made being still in force, and on this basis he estimates the cost of the renewals, eighteen pairs of points in all, to be £1,575.

Chief Inspecting Officer of Railways.—Colonel P. G. von Donop, R.E., having retired, under the age limit regulation, from the position of chief inspecting officer of railways, Colonel J. W. Pringle, R.E., has been promoted to that position. Since the outbreak of the war Colonel Pringle's services had been lent to the War Office by the Board of Trade, to which department he has now returned. Colonel von Donop went to the Railway Department of the Board of Trade in July, 1899, and he became chief inspecting officer of railways when Sir Arthur Yorke retired in July, 1913.

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HUDDERSFIELD MANAGER'S EXPERIMENTS.

In our issue of May 11 there appeared an illustrated description, written by Mr. R. H. Wilkinson, general manager and engineer, Huddersfield Corporation Tramways, of the experiment he is making in order to ascertain whether the use of differential gears will prevent the formation of corrugations on the rails. At the congress of the Tramways and Light Railways Association Mr. W. T. Robson referred, in his paper on tramway transit and comfort, to another experiment that Mr. Wilkinson is carrying out, with a view to eliminating jolting in braking. It is in the form of a brake drum keyed on an extended armature shaft in the same way as a pinion, with a Ferodo lined hand-brake operated in the usual way by means of the brake spindle. We are now able to confirm Mr. Robson's statement that in practice this innovation in tramcar braking is proving a success. Mr. Wilkinson does not claim that the idea is an invention, for a brake acting on a drum is a principle common to road motor vehicles. His attention was directed to the matter when making the alterations required to fit the Huddersfield trucks for running on the narrow gauge at Brighouse. This task presented no more trouble than it did in the case of the through cars between Bradford and Leeds, the difference in gauge being met by a lateral movement of the wheels on the axles. Mr. Wilkinson mounted a drum on an extension of the motor axle, and it is operated by a hand wheel in lieu of a lever. In that position the brake is worked under the best possible conditions, being entirely out of the reach of wet and dirt. Compared with the ordinary tramcar hand-brake, the working entails little exertion on the part of the motorman, and another advantage is that it needs to be adjusted only once a month. Its use also averts wear of the wheels, and Mr. Wilkinson anticipates that it will be widely adopted

NO PETROL FOR PLEASURE TRAFFIC.

Under the Defence of the Realm Act, a regulation was promulgated on August 19 declaring that after September 1 motor spirit shall not be used for the purpose of chars-a-bancs or other like vehicles on any excursion or trips of any sort except (a) trips in connection with ambulance or hospital work or the conveyance of wounded soldiers; or (b) trips in connection with naval, military or munition service or the conveyance of munition workers to or from their work; or (c) trips that are certified by the chief officer of police for the police area in which the motor spirit is used to be necessary or desirable in the interests of the travelling public. Any person using, causing or permitting to be used, motor spirit in contravention of this regulation will be guilty of a summary offence. The regulation will cause the abandonment of excursions run not only by a great number of seaside firms but by tramway companies that have taken up this form of enterprise. Prominent among the number is the Bristol Tramways and Carriage Company, which had already stopped pleasure excursions when the petrol licences were instituted. The company has branches at Bath, Cheltenham, Gloucester, and Weston-super-Mare. At the latter place September is the busiest month of the year. Before the war a chars-a-banc trip often extended over several days. As far as possible the company has maintained its day and night services of omnibuses and taxi-cabs.

MISCELLANEOUS NEWS AND NOTES.

Uniforms at Keighley.—The local Trades and Labour Council has published a letter calling attention to "the shabby condition of the uniforms worn by tramway workers," and urging the Tramways Committee to provide them with new clothes as early as possible.

War Allowances.—For the year ended March 25 last the allowances to dependants of the Oldham tramway employees amounted to £5,225, or .632*d.* per car mile run. The amount paid the previous year was £2,121, or .249*d.* per car mile.

Orderly Loading at Huddersfield.—A correspondent of a Halifax newspaper has testified to seeing 314 people awaiting a Huddersfield car at West Vale. They were standing most orderly two or three deep, and no official was present to encourage this formation.

Shortage of Labour.—The general manager at Oldham is unable to get men for painting the tramway standards. In the works department labourers are scarce, and women are preparing the cars for revarnishing. The cars are being overhauled at the rate of two per week.

Conductors' Seats.—As an experiment, seats have been provided on some of the Croydon Corporation tramcars for the women conductors. The example of Manchester in providing seats has led to the Liverpool newspapers suggesting the adoption of the same course in that city.

Flurried Woman Driver in Berlin.—A fine of 30*s.* was imposed on a woman tramcar driver in Berlin for driving to the common danger. Becoming flurried she failed to sound the gong and apply the brakes, with the result that the car knocked down three bandsmen of the 2nd Regiment of Guards.

Glasgow Tramways Management and the Wounded.—In a little more than a week the sum of £200 was deposited in boxes displayed in the Glasgow tramcars to defray the cost of providing tea and smokes in Ronken Glen for wounded soldiers. The tramways department conveys the men free of charge from the various hospitals.

An Expensive Accident.—In their annual report the Directors of the National Electric Construction Company statethat the accident on the Dewsbury and Ossett Tramways in November last, had resulted in a loss of over £2,000. If the accident had not occurred, the year's profit on that undertaking would have been a record.

Wires Displaced by a Boiler.—Owing to a large boiler on a lorry coming in contact with the support of the trolley wires in Incle Street and Crossflat, Paisley, a considerable stretch of trolley wire fell to the ground on August 22, during the afternoon. Three hours elapsed before tramway traffic between Paisley and Glasgow was resumed. Repair squads attended from both places.

Co-ordination of Power Supply in London.—As a result of the recent letter sent by the Board of Trade to electric supply authorities, requesting them to arrange to link up their stations in order to conserve the coal supply, a committee has been formed in London for that purpose. It is representative of all the borough councils, fifteen companies, and eight municipalities outside of the county of London.

Articled Pupils.—An Economies Committee appointed by Southend Corporation recently asked that particulars of the appointment of two articled pupils of the electrical engineer should be submitted to the council. The Tramways and Electricity committee have replied that the pupils are not paid by the Corporation and that they regard the agreements between the electrical engineer and the pupils as of a private nature.

Women Conductors.—The latest tramways undertaking to employ women as conductors is Newport, where half a dozen began to receive instruction on the cars on August 17. At Torquay there are 24 women conductors, five cleaners, and two clerks. The annual report of Wolverhampton Tramways Committee states that at the end of the financial year 44 women were employed, and their services had proved satisfactory.

Discharged Soldiers as Motormen.—Owing to all discharged service men up to 41 years of age having had to rejoin under the Military Service Act, the supply of men capable of being trained as motormen has been interfered with. Those not physically fit for active service are now, in many cases, being retained for other duties. At Newport the tramway manager has managed to secure several finally discharged soldiers, who are employed as motormen.

Traffic Lost at Southend.—Alderman A. Martin, chairman of the Tramways Committee, has informed the Corporation that recently the department lost £1,500 in fares because more cars could not be put on owing to the scarcity of drivers. The same reason has been advanced by Sir Charles Manders, chairman of Wolverhampton Tramways Committee, for the inability of the department to put on more cars.

Iron and Steel Institute.—The annual meeting will be held at the Institution of Civil Engineers, Great George Street, Westminster, S.W., on Thursday and Friday, September 21 and 22, at which a selection of papers will be read and discussed. The Council announces that the Privy Council has sanctioned the new by-law allowing for the expulsion from the Institute of members who are subjects of the countries at war with the United Kingdom.

The Return to Greenwich Time.—The Home Secretary announces that the three hours following midnight (summer time) of September 30 to October 1 are included in the summer time period. The change back to the old order does not take place until 3 a.m. summer time (or 2 a.m. Greenwich time) on October 1. At that hour the clocks will be put back one hour, so that the period 2-3 a.m. summer time will be followed by a period 2-3 a.m. Greenwich time.

From Bingley to Liverpool by Tramway.—At the cost of just over 4*s.* each in fares, two Bingley residents recently journeyed to Liverpool mainly by tramway. They started at 6 a.m. and reached the Mersey city at 5 p.m. The distance is 76 miles, and the only portion not served by a tramway is that of seven miles between Hebden Bridge and the village of Summit, on the boundary of Lancashire and Yorkshire. On several days in the week this section can be traversed by motor omnibus.

Oldham and District Parcel Traffic.—In reply to a communication from Oldham Chamber of Trade, Mr. P. Priestly, the tramways manager, has stated that the system is being rearranged, and he has also established receiving offices near the different termini. The manager adds that Rochdale is the only place among the towns connected with Oldham by tramway which has not fallen in with the parcel scheme, although he had recently brought the matter to the attention of the manager.

Manchester Front Exit Experiment.—In connection with the discussion of the payment on entry system by outside passengers at Manchester, Mr. J. M. McElroy has stated that just before the war he was experimenting with a car that gave an outlet towards the nearest footpath at each end. The object was to lessen the time occupied in loading and unloading at busy places, by requiring passengers to leave at the front end. Owing to the war further expenditure on the experiment had been stopped.

Tramway Material Required.—Tenders will be opened at the "Direccion General de Obras Publicas, Ministerio de Fomento," Madrid, for the construction and working, for a period of sixty years, of electric tramways as follow: On October 7 for the construction and working of an extension at Barcelona of the lines of the "Compania Nacional de Tranvias de Barcelona," and on October 11 for the construction and working of a tramway in Madrid, from the Calle de Acala to the Calle de Diago de Leon. An option on this concession is held by the "Sociedad Tranvia del Este."

Collision Between Following Cars.—Two West Bromwich tramcars which were loaded with an outing party were travelling down-hill at Dudley Port on August 16, when the first car pulled up to avoid running into a horsed vehicle. The motorman of the second car immediately applied the electric brake, but without effect. As the result of the collision the motorman of the second car received serious injuries, which necessitated his removal to hospital. The front of the car was considerably damaged, and as other cars could not be obtained from Tividale depot, the children had to complete the remainder of their homeward journey on foot.

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All-Steel Cars for Pittsburgh.—The Street Railway Company of Pittsburgh, Pennsylvania, has received the first delivery on its order for 240 all-steel cars placed the latter part of 1915. The remainder of the cars will be delivered in a few weeks.

Motormen Ignoring Stopping Places.—A deputation from Lees Urban Council has interviewed Mr. Percy Priestly, general manager of Oldham Corporation Tramways, on the subject of motormen frequently passing the top of Smithy Bridge and the Red Lion Inn without stopping, thus causing inconvenience to prospective passengers. The manager promised to rectify these irregularities, and asked the deputation to report any further breach. Reference was also made to the matter of compulsory stops, and Mr. Priestly pointed out that an agreement between the two authorities stated that the only compulsory stop was at the top of Smithy Bridge.

Road Work for Conscientious Objectors.—In the House of Commons on August 10 the Home Secretary stated that arrangements had been completed for employing some hundreds of conscientious objectors on the upkeep and repair of important roads under the Road Board directly the cases were passed by the Central Tribunal. Many local authorities are refusing the offer of the services of such men conveyed in a letter from the Committee on Works of National Importance. The Committee state it is intended that the men should sustain a certain financial sacrifice, but the actual terms to be paid are left for the arrangement of employers. The men would be under the general supervision of the Committee.

Effect of the Petrol Shortage.—An indication of the great restriction of motor traffic effected by the petrol licence system is to be seen in London not only by the reduction of the number of omnibuses in service but by the disappearance of hundreds of private motor-cars. The latter effect is particularly noticeable in the number travelling to and from the City. At certain hours in the morning and evening there was a constant procession of such vehicles along the Victoria Embankment, but it is now an easy matter for a pedestrian to cross the road even at the busiest period. It is remarked that at Bristol many business men have given up their cars and have returned to the railway, or are using the tramcars and omnibuses.

A Polish University with a technical department, has been set up by the Germans in the captured city of Warsaw. The university has faculties of law and political economy, of historical philosophy, and of mathematics and natural science. In the technical department, civil engineering, and machine engineering are taught as well as electricity, chemistry, and architecture. As the arrangement is only provisional, no professors have been nominated. Instructorships for one year only were granted, and these were given mostly to residents of Warsaw. The technical department has 477 students, and they are divided as follows: Architecture 42, Building 97, Civil Engineering 18, Machine Engineering 175, Electricity 41, and Chemistry, 104.

Westinghouse War Relief Fund.—Mr. A. G. Seaman, manager of the publicity department of the British Westinghouse Electric and Manufacturing Company has forwarded a copy of the employees' war relief fund, for the period between August 22, 1914 and June 30 last. Over 2,100 of the company's officers and workmen have joined the forces and the fund is supported by the employees, officers, and directors. The total receipts were £27,965, of which sum the employees contributed £18,942 and the company £8,790. Payments to dependants totalled £15,647. On Christmas gifts £885 was expended, and £780 was paid to local and national patriotic funds. The balance of £10,479 and subscriptions since received are being used to continue the good work of the fund.

The Starting Signal on Underground Railways.—At the adjourned inquest on a man who was fatally injured at the City Road Station of the City and South London Railway, several witnesses suggested that the driver mistook the whistle of a guard on an adjoining platform for his starting signal. Mr. J. Morgan, chief traffic inspector, said this was the first fatal accident of the kind that had happened on this railway, which was the first tube opened in London. Passengers were supposed to get clear of the train in twenty seconds. Mr. Morgan incidentally observed that a delay of two minutes would hold up the whole line. The jury found that the death was brought about through the guard inadvertently starting the train before the passengers had alighted, and they suggested the adoption of a uniform whistle and the provision of green flags for the guards.

Improving the Edinburgh Cars.—After considering a report from Mr. J. D. R. Cox, general manager, Edinburgh Tramways Company, the magistrates have granted the company a licence to run the cars for one month, at the end of which time the question will be further considered. Mr. Cox stated that 20 bogies have been re-fitted at a considerable cost; 39 cars have had brake gear overhauled, the design of the brake gear being strengthened and improved; while minor renovations have been carried through on all the cars. The rate of overhauling brake gear and other details will be accelerated in the future, and the whole of the work requisitioned should be completed by May 28, 1917, with the exception of the work on car-bodies. Arrangements had been made for more efficient cleaning of the cars. Since May 28, 1916, 197 cars have been overhauled or repaired.

Thoughtful Conductors at Hull.—With the support of Mr. W. J. McCombe, manager of the Corporation tramways, the women conductors held a whist drive and dance for the purpose of raising funds to provide tobacco for local tramwaymen serving at the front. A sum of £20 was realised, sufficient to send each soldier a half-pound of tobacco, 125 cigarettes and two packets of cigarette papers. Many grateful acknowledgments of the gifts have been received by Mrs. Morehead and Mr. E. P. Upton, the secretaries. One R.F.A. gunner wrote: "Our memories are stirred by these kind reminders. These thoughts help us to keep up our spirits and to bear our discomforts without murmuring. As one of those who have left a dear wife and children to serve with our batteries pounding away at the German lines, I am thankful to say we have no casualties as yet."

Contractors' Liabilities.—Messrs. Dick, Kerr and Co., Ltd., were the defendants to a declaration asked for, in the King's Bench Division on July 31 by the Metropolitan Water Board, that the construction of reservoirs near Staines had not been determined by any notice received by defendants from the Minister of Munitions, and that plaintiffs were entitled to the plant, tools, and material on the site of the works on Febuary 21, 1916. Defendants alleged that in consequence of an order given by the Minister of Munitions they were compelled to cease the work. This notice had rendered the performance of the contract impossible and illegal, and the parties had been released from their liabilities under the contract. Mr. Justice Bray found that the contract was not abrogated. He granted an injunction against defendants removing any machinery except so far as they were acting as agents under the orders of the Minister of Munitions.—An appeal will be taken to the House of Lords.

The Junction between the L.U.T. and M.E.T.—In order to facilitate car repairing and the carrying out of war work, the Acton Council some months ago sanctioned the construction of a loop line through King Street in order to join up the London United and Metropolitan Electric Tramways. A condition was imposed that the line should not be used for passenger traffic. At the August meeting of the Council a sub-committee reported having considered the condition on which the Council gave consent to the laying of the line, and that the companies had informed them they did not consider that in running parties to the corner of Horn Lane and King Street, and allowing the cars to run empty over the loop, picking up the passengers again in the High Street, and proceeding on their journey southward, or vice versa, they were departing from the arrangement made. That practice they would cease in future, and they were not prepared to discuss terms for running a passenger service over the loop line, as such service would be run at a loss.

Railways, Tramways, and the Defence of the Realm Act.—In the Defence of the Realm (Acquisition of Land) Bill, which has been introduced in the House of Commons, Clause six makes provisions with respect to the maintenance of railways and tramways that have, for war purposes, been laid on, over, or under any public highway, and also deals with cases where any public highway has been closed. Dr. Addison (Parliamentary Secretary, Ministry of Munitions) introducing the Bill stated that sometimes the Department had had to do very drastic things in connection with railways, and Clause six provided for the continuance of the use of certain light railways and sidings, subject to appropriate orders by the Board of Trade. They also had to deal with cases where they had arranged for the supply of light and power outside the area of existing supply authorities. Power was taken to continue the supply. It had been decided that the Railways and Canal Commission was the most suitable body for the purpose of dealing with the questions arising under the Bill. They would have the assistance of assessors, and would be authorised to make local inquiries. On August 21 Clauses 6 and 7, which enable railway, tramway, water, light, heat, and power undertakings set up by Government Departments during the war to be continued upon certain conditions after the war, were agreed to, with modifications proposed by the Solicitor-General. On Clause 8, which provides for determination of certain questions arising under the Act by the Railway and Canal Commission, the Solicitor-General refused to accept an amendment for a special tribunal to be appointed, but said that if under any other Act a more appropriate tribunal was appointed, he would be willing to consider its application to this matter.

PERSONAL.

Mr. John Harris, City Sheriff of Lincoln, and secretary to Messrs. Clayton and Shuttleworth, has been added to the Commission of the Peace for Lincoln.

Mr. W. Fraser, station superintendent, Barking Council electricity department, has been appointed electrician in charge of a Midland shell factory.

Mr. G. Lewis, who retires at the end of August from the position of an inspector to Manchester Corporation tramways, has been continuously employed on the city tramways since 1876.

Lance-Corporal A. Wigton, Royal Scots, formerly a motorman on the Glasgow Corporation Tramways, has been awarded the Military Medal for bravery. He has also received the French Medal Militaire. He has won distinction as a grenadier in France.

Private E. Smith, a Birkenhead Corporation motorman, early in the war joined the 13th Cheshire Regt., and was discharged as physically unfit for war service. Although he was over forty years of age, he then entered the motor transport section of the A.S.C., and has been in France and Belgium since March last.

Dr. J. Theodore Merz, D.C.L., who presided, as chairman, at the annual meeting of the Tyneside Tramways and Tramroads Company, has devoted many years of his life to the organisation and promotion of scientific manufactures. The honorary degree of D.C.L. of Durham University was conferred upon him in recognition of his services in that respect. He has been closely identified with Armstrong College, and has achieved literary distinction through "A History of European Thought in the Nineteenth Century"—"Newcastle Daily Journal."

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Corporal O. G. Kingston, Gloucester Regt., formerly a conductor on Gloucester Corporation Tramways, has received the Military Medal by immediate award on the field. Subsequently he was wounded, and was temporarily buried by the blowing up of a dug-out in which he was receiving attention from the medical officer. After great exertion by several comrades he was rescued. The medical officer has informed the corporal's mother that her son "worked like a horse for three days and nights with hardly any sleep or food, and at the end did not come out with the battalion, but stayed behind voluntarily to help another regiment. He was perfectly calm in the hottest fire, and gave confidence to everybody. He is a very great loss to the battalion, every man in which recognises how splendidly he behaved."

Mr. J. S. D. Moffet, general manager, West Ham Corporation Tramways, who is leaving to take up similar duties at Belfast, was the recipient on August 7 of a silver rose-bowl and a pair of binoculars from the shed, traffic and works employees. Mrs. Moffet was presented with a silver dressing-table set. The ceremony was attended in the recreation room by a large gathering of employees and their wives, and the presentation was made by Mr. W. T. Young, traffic superintendent, who referred to the happy relations that had existed between Mr. Moffet and his staff. In thanking the subscribers, Mr. Moffet regretted that the war would prevent him officially saying good-bye to 375 employees who would otherwise have been there. Owing to the war the social club, founded by Mr. Blain, his predecessor, had not been quite so prominent as it might otherwise have been, but he had to record that the name of Motorman Blunden, one of their most popular members, would long live in the memory of those employees who had been in the trenches, for his work in collecting and sending out comforts subscribed for by every member of the staff. Referring to the somewhat strenuous three years he had spent at West Ham, Mr. Moffet regretted that he would not be there to see the fruition of the schemes he had inaugurated with the support of the Corporation for the benefit of the undertaking. These plans related to the remodelling of the cars, restoring the permanent way, and securing revenue by the new fares scheme that would come into force at an early date. He impressed upon all branches of the department that unless they all pulled together and loyally supported his successor, no scheme could be a success. Mrs. Moffet also expressed gratitude for the gift presented to her, and said that her chief regret in leaving was that she would not be able to assist in welcoming back the men who had gone to fight for their country.

We regret to record the death of **Mr. Frederic William Manuelle,** of Messrs. A. and F. Manuelle, granite quarry owners, which occurred on August 21. The business will be continued under the same name, and Mr. James Leigh, the present manager, who has been connected with the firm for the past forty years, will continue to act as manager.

The Roll of Honour.—Inspector D. Menzies, who has died of sunstroke, enlisted a year ago in the Royal Flying Corps, and was attached to the Indian Expeditionary Force. Mr. Menzies, who belonged to Dundee, was for years connected with the Broughty Ferry Tramways, and was an inspector when he left to take over the duties of chief inspector of Dunfermline and West Fife Tramways upon that company being founded. Corporal J. Riley, King's Own Yorkshire Light Infantry, and for several years a motorman on the Ilkeston Council Tramways, was killed in action in France on July 3. A letter from his company commander states that he was gallantly doing his duty, and that all the officers of the company held a high opinion of him. The gallant soldier leaves a wife and two children. Corporal F. Perry, son of a Cardiff motorman, and formerly a conductor himself, has died of dysentery in Mesopotamia. Corporal Perry enlisted in the R.F.A. about six months before the outbreak of war. He was wounded at Armentieres, and on recovery returned to France, proceeding to the East three months ago.

CONTRACTS AND ORDERS.

Hadfields, Ltd., have a contract for the supply of points and crossings to Bolton Corporation Tramways.

Clayton & Shuttleworth, Ltd., of Lincoln, are supplying portable steam engines to the War Department

Shepherd's Parging Block Company, Ltd., have received an order for a supply of block parging for the Coventry Corporation Tramways.

Straker & Squire (1913), Ltd., Blackfriars, London, S.E., Twickenham, and Bristol, have a contract for supplying motor chassis and parts to the War Department.

The War Office have placed contracts with the Austin Motor Company (Birmingham), and with the Standard Motor Company, Ltd. (Coventry), for the supply of petrol engines.

Electrical Supplies to the War Office.—The latest list of War Department contracts includes the following:—Electric cable, Siemens Bros. & Co., Ltd., and Liverpool Electric Cable Co., Ltd.; electric light and power sundries and rotary converter at Woolwich, General Electric Co., Ltd.; generating sets, W. H. Dorman & Co., Ltd.; electric generators and motors and parts, British Thomson-Houston Co., Ltd.

WANTED FOR BINDING, one copy of The Tramway and Railway World, No. 30 (December 11, 1915), Volume 38. Reply to G. E. Stechert & Co., 2, Star Yard, Carey Street, London, W.C.

Vols. XI. (Jan.–June, 1902) and XIII. (Jan.–June, 1903) of The Tramway and Railway World (either bound or unbound) are required. Address M.D., care of "Tramway and Railway World."

FINANCIAL REPORTS AND MEETINGS.

Glasgow Subway Railway Company.—The directors have declared an interim dividend of 1 per cent. on the preference shares for the half-year ended June 30.

Stewarts and Lloyds, Ltd.—The board announce an interim dividend at the rate of 6 per cent. per annum on the preference shares and 10 per cent. per annum on the preferred ordinary shares for the six months ended June 30.

Aberdeen Suburban Tramways Company.—The report for the half-year ended July 31 gives the profit as £1,054, while the balance to the credit of profit and loss account is £3,209. This sum the directors propose to apply as follows: £1,200 to the renewal and depreciation account, which will then stand at £16,700; a dividend at the rate of 5 per cent. for the past year on the paid-up capital, £1,501 18s.; directors' fees, £31 10s.; leaving to be carried forward £415 14s. 3d.

Tyneside Tramways and Tramroads Company.—Dr. Merz, presiding at the annual meeting on August 15, said they need not be discouraged by the reduction of the dividend, because it was largely explained by the fact that the holiday traffic, which in former years always showed up well, had practically disappeared for the present. The ordinary traffic had been reduced by £945. There was a small increase in the workmen's traffic. The week-end traffic was now regular, and especially in fine weather, larger than last year. To date the traffics had increased. On the whole they might look forward to a better time during the second half of the year. Mr. J. E. Henderson (deputy-chairman) seconded, and the report was adopted. The chairman moved and Lord Armstrong seconded the payment of the dividends. A donation of £10 10s. was voted to the funds of the Royal Victoria Infirmary, and the directors were empowered to contribute £200 to charitable purposes in connection with the war during the present half year.

BUSINESS NOTES.

Spencer-Moulton Tires.—Under the management of Mr. Leo Swain at the head office, 239, Deansgate, Manchester, the solid tire department of George Spencer Moulton & Co., has met the demands of the commercial community by opening offices or agencies in the chief provincial centres, where hydraulic presses have been installed in order that replacements may be rapidly and efficiently handled.

Messrs. W. T. Henley's Telegraph Works Co., Ltd., the well-known manufacturers of Henley Solid Band Tires, owing to the great increase in their solid tire business in Scotland, have recently opened a depot adjacent to their Glasgow branch office to deal with solid tire business only. A large stock of solid tires in all sizes is held here, and they have installed one of Hollings and Guest's latest and most improved type of hydraulic tire presses, enabling clients to obtain and have solid tires fitted without delay. The company has also sent us a booklet upon the abnormal wear of solid tires, informing us that they will be pleased to send one to any user of solid tires who cares to apply for one. This booklet will be found extremely interesting to solid tire users, as it is a compendium of extracts from various technical publications giving disinterested advice as to how to obtain the best mileage from solid tires.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-four of the principal tramway undertakings in the United Kingdom for the week ended August 12 give total receipts of £211,411, or £33,849 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or sixty-nine more than for the corresponding week. The receipts this year were at the rate of £94 16s. per mile of single track, and last year at the rate of £82 3s. 4d., thus showing an increase for the week of £12 12s. 8d. per mile open. This increase was distributed over the whole of the forty-four tramways included in the return. In no case was a decrease reported. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. Aug. 24.	A Week Ago.
5%	5%	Alabama Traction, 5% 1st. Mt.	—	67	68½	69½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4¾	73/9	75/-
4%	4%	Do. 4% Deb. ...	100	91	74⅜	75½
4½%	4½%	Do. 4½% Deb. ...	100	98½	76	76
5%	5%	Do. 5% Deb. ...	100	96	74½	76⅜
7d	1/-	Auckland Elec. Trams. Ord. ...	1	1⅝	20/6	20/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	93⅜	94
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. * ...	10	11⅜	10⅜	10⅜
4½%	4½%	Do. 4½% Deb.... ...	100	96	83	83
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	92	92
$1	$1	Brazilian Trac. & Power Ord....	$100	66	61⅜	62
$1½	$1½	Do. 6% Cum. Pref.	$100	97	93½	93⅞
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6 1/16	6¼
2/6	2/6	Do. 5% Cum. Pref.	5	5	85/-	85/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	93	93
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	47	40 1/16
6%	5%	Do. Pref. Ord....	100	106	48	48
5%	5%	Do. 5% Cum. Pref.	100	103	67⅜	66⅜
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	80⅜	80⅜
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	67	67
—	—	Brit. Elec. Trac. Ord.	100	—	35½	36½
—	—	Do. 6% Cum. Part Pref. ...	100	—	80½	80½
5%	5%	Do. 5% Deb.	100	92	84½	85
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	70	70
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	92½	92½
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	6 13/16	6 13/16
1/3	1/3	City of B.A. Trams.	5	5⅛	90/7½xd	91/10½xd
5/-	4/-	Dublin United Trys 6% Pref.	10	12	10 5/8	10 5/8
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79⅜	79⅜
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74⅜	74⅜
—	—	La Plata Trams. Ord.	1	⅞	2/1½	2/1½
5/6	6/-	Lanarkshire Trys. Co.	10	10½	9⅜	9⅜
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81½
9½d.	9½d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	1⅞	2/3	2/3
6d.	6d.	Do. 5% Pref.	1	⅝	8/6xd	8/7½xd
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	62⅜	59½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88½	88½
5%	5%	Do. 5% Inc. Deb.	100	88½	79½xd	82½xd
4%	4%	Lon. Unt. Trns. 4% 1st Mt. Db.	100	55	47½	48
3/-	3/-	Madras Elec. 6% Pref. ...	5	5⅛	96/6	96/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	66⅜	67½
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	69⅜	70½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	78	79½
$1½	$1½	Mexico Trams. Common ...	$100	70	29	27⅜
5%	5%	Do. 1 Mt. 5% G.B. ...	—	84	42⅜	40⅜
6%	6%	Do. 6% Mt. Bds.	100	76	34	34
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	90½	96½
4½%	4½%	Do. 4½% Stg. Debs.	100	99	94½	94
1/2*	1/2*	National Steam Car	1	½	18/6	19/10½
9d.*	9d.*	New General Traction	1	½	7/9	7/9
6d.	8d.	Northern Gen. Trans. Ord. ...	1	⅝	15/4½	16/-
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	66/-	66/-
5%	5%	Do. 5% 1st Deb.	100	80½	73⅜	74½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80½xd	80½xd
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	⅛	10/4½xd	11/3xd
8d.	10d.	Provincial Trams. Ord.	1	⅝	16/6	16/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84	84
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	91	91½
5%	5%	1st. Mt. 5% 50 yr.	100	89½	82½	82½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	91½	90½
5%	5%	Do. 5% Perp. Deb.	100	99½	82½	82½
—	—	Singapore Elec. Trams	5/-	¼	4/10½	4/10½
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	96½	96½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	82½	85
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	93½	92½
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	78½	78½
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	¾	9/3	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	90/-	90/-
		Metropolitan Dist. Ord. ...	100	21⅜	18	18½
		Undgd. Elec. Rys. of London ...	10	2½	38/9	40/-
		Do. "A"	1/-	⅜	6/3	6/0⅜
		Do. 4½% Bds of 1933 Rd.	—	99	102½	102½
		Do. 6% 1st Cum. In. Db.	100	114	107½	107½
		Do. 6% In. Bonds Rd. ...	—	88	92/-	91⅜

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1915	Latest Return. 1916	Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	Aug. 19	£50,932	£48,713	34	£1,675,343 —	£9,464
Auckland.....(28 days)	July 28	20,408	21,507	4	21,507 —	646
Ballarat and Bendigo ...	June 18	2,692	2,793	12	10,375 +	878
Brazilian Traction Mlrs.	June	6.591 940	6,961,000	26	39,950.000	+2,265,890
Brisbane	July	31,150	32,880	31	227,230 +	17,580
British Columbia.....$	June	498,093	529,078	52	6,602,624 —	703,939
Buenos Aires Lacroze ...	July 1	41,460	38,439	5	38,439 —	3,021
Burmah Tramway ... Rs.	July 29	3 726	3,437	52	... +	3,920
Calcutta.....Rs.	Aug. 19	68,785	69,919	34	2 231,228 +	103,358
Cape Town	July	...	13,357	...	...	...
Carthagena & Herrerias..	July 30	2,157	2,371	31	18,740 +	5,935
Cordoba	May	14,494	14,868	9	28,921 +	818
East India	July	2.231	2,220	52	25,370 +	1,586
Hong Kong .....$	July 15	12,445	15,759	31	386 509 +	86,496
Kalgoorlie	May	3.269	2,921	21	12,437 —	1,035
La Plata	July	4,054	3,909	31	29,835 +	15
Lima	Apr.	31.623	33,556	18	134,629 +	5,614
Lisbon .....Escu.	June	...	202,451	...	...	...
Madras .....(2 weeks)	Aug. 15	30,869	32.269	33	469,380 +	33,100
Manila .....$	Apr.	117,450	124,350	...	505,381 +	16,765
Manaos .....Rs.	May	...	152,854	...	...	...
Melbourne	May	...	69,275	...	...	...
Montevideo	July	25,161	25,220	39	266,288 +	14,435
Pernambuco	Aug. 20	2,813	3,193	33*	98,566 —	4,505
Peruvian .....$	July	724,538	835,430	5	835,430 +	110,592
Port Elizabeth	July	...	3,166	...	...	...
Rangoon	July	4,629	4.357	31	32,938 —	1,436
Shanghai .....$	July 19	26,935	29,779	...	...	...
Singapore.....$	July 8	11,604	12,726	27	334,878 +	37,221
Toronto.....$	June	787,558	884,491	26	5,335,199 +	525,136
Winnipeg	June	255,549	254,686	26	1,701,474 —	50,782

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Name.	Week ended	Latest Return. 1915	Latest Return. 1916	Incr. or Dec.	Wks.	Aggregate. 1916	Incr. or Dec.
Aberdare U.D.C.	Aug. 8	£290	£436	+ 156	19	£7,277	+ £650
Aberdeen Corporation...	,, 16	1,905	2,092	+ 187	11	21,793	+ 671
Accrington Corp.	,, 16	593	639	+ 46	20	11,748	+ 331
Ayr Corporation	,, 19	655	681	+ 26	14	7,205	+ 20
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	,, 20	1,428	1,642	+ 214	20½	31,336	+ 2,773
Birmingham Corp.	,, 19	14,739	16,636	+ 1,897	20	332,539	+ 55,864
Do. Motor Omnibuses	,, 19	914	1,089	+ 175	20	20,208	+ 2,720
Blackburn Corp.	,, 16	1,296	1,358	+ 62	20⅜	26,946	— 996
Blackpool & Fleetwood.	,, 19	2,003	2,679	+ 676	33	26,580	+ 2,127
Blackpool Corp.	,, 17	4,006	6,394	+ 2,388	20	46,603	+ 8,484
Bolton Corporation	,, 20	2,819	3,036	+ 217	21	59,730	+ 3,704
Bournemouth Corp.	,, 23	2,986	3,288	+ 302	21	50,405	+ 2,674
Bradford Corporation ...	,, 19	7,139	7,923	+ 784	20	140,228	+ 1,769
Brighton Corporation ...	,, 20	1,624	1,942	+ 318	20⅜	26,737	+ 2,198
Bristol	,, 18	10,279	10,841	+ 562	33	328,474	+ 12,961
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	,, 19	1,570	1,770	+ 200	21	36,068	+ 1,645
Burton-on-Trent Corp...	,, 20	299	322	+ 23	20	5,524	— 573
Bury Corporation	,, 20	1,501	1,568	+ 67	21⅜	30,215	+ 1,200
Cardiff Corporation.....	July 22	2,828	3,139	+ 311	16	47,494	+ 2,745
Chatham & District.....	Aug. 17	1,350	1,469	+ 119	33	39,612	+ 1,577
Chesterfield Corp.	,, 10	280	320	+ 40	19	5,443	+ 184
Colne Corporation	,, 24	234	264	+ 30	...	...	...
Cork Electric	Aug. 17	554	557	+ 3	33	16,597	+ 123
Croydon Corporation ...	Apr. 28	1,726	1,403	— 323	4	5,417	— 666
Derby Corporation	Aug. 19	1,092	1,281	+ 189	20½	23,398	+ 1,334
Dover Corporation	*	...	...	...	...	...	...
Dublin & Lucan	,, 18	167	190	+ 23	7	1,381	+ 168
Dublin United.....	,, 11	6,215	7,820	+ 1605	32	188,763	— 5,059
Dundee City	,, 16	1,373	1,473	+ 100	13¾	18,897	+ 502
East Ham Corporation	,, 19	1,387	1,371	— 16	20½	27,142	+ 48
Exeter Corporation.....	,, 18	465	485	+ 20	20	8,132	+ 45
Glasgow Corporation	,, 19	21,763	23,638	+ 1,875	11⅜	268,927	+ 23,644
Glasgow Subway.....	,, 19	958	1,032	+ 74	33	38,132	+ 3,931
Glossop (U. Elec. Supp.)	,, 19	138	153	+ 15	34	4,649	+ 494
Halifax Corporation.....	,, 15	2,520	2,875	+ 355	19¾	45,998	+ 342
Do. Motor Omnibuses	,, 15	59	72	+ 13	19½	982	— 71
Hastings & District.....	,, 18	1,566	1,930	+ 364	33	32,877	+ 1,507
Huddersfield Corp.	,, 19	2,752	3,387	+ 635	20	60,761	+ 5,525
Hull Corporation	,, 19	2,904	3,286	+ 382	20	63,702	+ 942
Ilford U.D.C.	,, 19	685	741	+ 56	20	14,360	+ 726
Ilkeston Corporation ...	,, 23	145	159	+ 14	21	2,975	+ 144
Ipswich Corporation	,, 19	666	605	— 61	20	11,293	— 279
Isle of Thanet	,, 19	1,079	1,002	— 76	46	15,669	— 2,866
Kilmarnock Corp.	,, 19	164	188	+ 24	12½	2,452	— 36
Lanarkshire	,, 17	2,179	2,593	+ 414	33	74,968	+ 11,716
Lancashire United	,, 16	1,811	2,052	+ 241	33	58,718	+ 2,277
Leeds City.....	,, 19	9,402	10,491	+ 1,089	21	201,627	+ 17,475
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	,, 19	783	939	+ 156	13⅜	12,473	+ 1 448
Leyton U.D.C.	,, 17	1,912	1,868	— 44	20	34,363	+ 555
Liverpool Corporation...	,, 19	13,848	15,204	+ 1,356	33½	463,345	+ 22,889
Llandudno & Colwyn B.	,, 11	681	907	+ 226	36½	11,549	— 89
London County Council	July 19	46,999	48,584	+ 1,585	15½	755,622	+ 98,068
London Genl. Omnibus	*	...	...	...	...	...	...
London United.....	*	...	...	...	...	...	...
Lowestoft Corporation...	*	...	...	...	...	...	...
Maidstone Corporation...	Aug. 17	239	249	+ 10	20	4,451	— 152
Manchester Corp.....	,, 19	17,971	19,235	+ 1,264	21	386,167	+ 21 896
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	July 29	230	258	+ 28	17½	3,744	+ 280
N'castle-on-Tyne Corp.	Aug. 12	6,415	7,055	+ 640	20	127,093	+ 3,736
Newport (Mon.) Corp....	,, 19	889	1,023	+ 134	20	19,112	+ 1,548
New St. Helens & Dist.	,, 16	1,114	1,369	+ 255	7	8,529	+ 496
Northampton Corp.....	,, 18	711	758	+ 47	20	14,345	— 1,414
Nottingham Corp.....	,, 17	3,758	4,158	+ 400	20	78,051	+ 1,322
Oldham Corporation ...	,, 20	2.475	2.529	+ 54	23	53.980	+ 3,380
Portsmouth Corp.....	,, 12	3,171	3,807	+ 636	20	55,103	...
Preston Corporation.....	,, 16	1,013	1,258	+ 245	19⅞	21,743	+ 2,251
Provincial	,, 19	2,768	2,989	+ 221	46	104.595	+ 5,680
Reading Corporation.....	,, 17	874	945	+ 71	19⅞	16,854	+ 671
Rhondda Tramways.....	,, 3	1,215	1,408	+ 193	31	38,486	+ 2,601
Rochdale Corporation....	,, 19	2,001	1,979	— 22	20½	37,553	+ 1,164
Rotherham Corp.....	,, 23	1,259	1,764	+ 505	20½	31,512	+ 7,428
Salford Corporation.....	,, 21	5,424	5,601	+ 177	20⅜	114,978	+ 6,571
Sheffield Corporation....	,, 20	9.326	10,825	+ 1,499	21¼	221.821	+ 36,143
Southampton Corp.....	,, 16	1,649	1,939	+ 290	19⅝	32,910	+ 2,596
Southend-on-Sea Corp....	,, 16	1,332	1,960	+ 628	20	19,766	+ 1,311
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.....	,, 19	872	933	+ 61	20½	17,078	+ 605
Sunderland Corp.....	,, 20	1,574	1,789	+ 215	20	33,647	+ 2,122
Sunderland District...	,, 9	657	833	+ 176	41	24,524	+ 1,421
Swindon Corporation ...	,, 16	211	236	+ 25	19⅜	4,034	+ 24
Torquay Tramways.....	,, 10	882	1,072	+ 190	32	17,481	+ 801
Tyneside Trys. & Tmrds.	,, 9	628	867	+ 239	6	4,389	+ 318
Wallasey Corporation ...	,, 19	1,508	1,768	+ 260	20½	29,278	+ 1,402
Walsall Corporation.....	,, 19	847	884	+ 37	34	27,095	+ 2,764
Walthamstow U.D.C....	,, 19	1,184	1,196	+ 12	20	23,077	+ 3,258
Warrington Corp.....	,, 10	459	535	+ 76	19	9,252	+ 642
West Ham Corporation	,, 17	3,476	3,329	— 147	19⅜	65,748	+ 2,553
Wigan Corporation	,, 17,	1,514	1,660	+ 146	20	33,644	+ 2,853
Wolverhampton Corp....	*	...	...	...	...	...	...
Yorkshire (W Riding)...	,, 20	1,696	1,903	+ 207	34	59,108	+ 5,248

* Issue of Traffic Returns suspended during the War.

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CHAPTER IX.—RAIL WEAR.
At joints—On new tracks—On steep gradients—On wheel tires—Contact of wheel and tire—Leeds special rail section—Railway rails—Depression of check.

CHAPTER X.—COMPOSITION AND MANUFACTURE OF TRAMWAY RAILS AND RAIL WEAR.
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CHAPTER XIV.—SURFACE DRAINAGE AND RAIL MAINTENANCE.
Rail cleaning—Rail grinding—Rail planing.

CHAPTER XV.—SPECIAL TRACK WORK.
Design and standardisation of points—Unbroken main line crossings—Renewable plates—Switches—Mechanism for movable points—Heel pins—Tongue heel adjusters—Guard rails—Spiral tables for curves and junctions—Special track problems.

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."

Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

THE GREAT INDIAN PENINSULA RAILWAY COMPANY.

The Directors are prepared to receive tenders for the supply of the following Stores, namely:—

Steel Tires for carriages and wagons.
Tire retaining rings, bolts, and nuts.

Specifications and forms of tender may be obtained at this office on payment of the fee for the specification, which payment will not be returned.

Tenders must be delivered in separate envelopes, sealed and addressed to the undersigned, marked "Tender for Steel Tires for Carriages and Wagons," or as the case may be, not later than 11 o'clock a.m., on Thursday, September 7, 1916.

The Directors do not bind themselves to accept the lowest or any tender.

R. H. WALPOLE,
Secretary.

Company's Offices,
48, Copthall Avenue, E.C.
London, August 30, 1916.

GREAT NORTHERN RAILWAY COMPANY (IRELAND).

TO MANUFACTURERS OF SWITCHES AND CROSSINGS.

The Directors are prepared to receive tenders for the supply of Switches and Built Crossings and Chairs for same.

Copies of the drawings and specification may be obtained from the undersigned on payment of two guineas, which will be refunded on receipt of a bona fide tender and the return of the drawings.

Tenders, made out on forms supplied by the Company, should be delivered, under sealed cover, endorsed "Tender for Switches and Crossings," to the undersigned not later than 10 a.m. on Monday, September 25, 1916.

The Directors do not bind themselves to accept the lowest or any tender.

T. MORRISON,
Secretary.

Secretary's Office,
Amiens Street Terminus,
Dublin, August 25, 1916.

SEVENOAKS URBAN DISTRICT COUNCIL.

The Sevenoaks Urban District Council invite Tenders for the supply of a Steam Motor Wagon with a separate tank of 1 000 gallons capacity fitted for street-watering, in addition to the ordinary wagon body for haulage of road metal.

Engineers are invited to submit Tenders giving full particulars and mode of payment acceptable by them as a loan for the purchase cannot be obtained.

Further information can be obtained on application to Mr. SAMUEL TOWLSON, A.M.I.C.E., Surveyor to the Council, Urban Council Offices, Argyle Road, Sevenoaks.

Tenders, endorsed "Steam Motor Wagon," to be addressed to the Acting Clerk of the Council, Urban Council Offices, Sevenoaks, to be delivered by noon on Monday, September 11 next.

Neither the lowest nor any Tender will necessarily be accepted.

By order,
KIRBY J. BAILEY,
Acting Clerk of the Council.

Urban Council Offices,
Argyle Road Sevenoaks.
August 28, 1916.

TRAMWAY POLES WANTED.

Wanted.—Few medium B.S.S. Tramway Poles. Particulars and prices to BOX No. 46, THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.

FOR SALE.

COUNTY BOROUGH OF SWANSEA.

ELECTRICAL PLANT.

The Tramways and Electric Lighting Committee of the Swansea Corporation have the following plant for disposal:—

One 300-h.p. Maclaren Marine-type Engine, direct coupled to a 225-kw. Siemens-Schuckert 440 550-volt D.C. Compound-wound Generator with spare armature.

Further particulars may be obtained from the BOROUGH ELECTRICAL ENGINEER, Strand, Swansea.

Offers, endorsed "Electrical Plant," must be sent to the undersigned not later than September 6, 1916.

The Corporation do not bind themselves to accept the highest or any offer.

H. LANG COATH,
Town Clerk.

Guildhall, Swansea.
August 24, 1916

POSITIONS VACANT.

STRETFORD URBAN DISTRICT COUNCIL.

ELECTRICITY DEPARTMENT.

Wanted, Switchboard Attendant accustomed to Batteries and Boosters in a three-wire d.c. Lighting, Power and Traction Station.

Battery Room Assistant, accustomed to lighting and traction battery, Tudor type.

Test Room Assistant, must have experience in testing, calibration, and repair of meters, also inspection and testing of consumers' installations for lighting and power.

Candidates, who must be ineligible for military service, to state full qualifications and wages required.

Applications, accompanied by copies of not more than three recent testimonials, to be addressed forthwith to the Resident Engineer, Electricity Works, Chester Road, Stretford.

BOROUGH OF REIGATE.

ELECTRICITY WORKS.

The Reigate Town Council invite applications from persons ineligible for military service for the post of Shift Engineer at their Generating Station, Wray Common Road, Reigate, at a wage of £2 a week.

Applicants must have had previous experience in H.T. supply, and preferably with Diesel Engine Plant.

Applications, accompanied by not more than three recent testimonials endorsed "Chief Engineer," must be delivered to the Borough Electrical Engineer, Wray Common Road, Reigate, on or before noon of Wednesday, the 13th day of September next.

By Order,
ALFRED SMITH,
Town Clerk.

Municipal Buildings,
Reigate.
August 28, 1916

SWITCHBOARD ATTENDANT.

Switchboard Attendant wanted, ineligible, for duration of war. Wages 30s. per week, war bonus 4s., if married. D.C. generators and A.C. conversion plant in use. Applications to Borough Electrical Engineer, St. Peter's Chambers, Glebe Street, Stoke-on-Trent.

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Tramway AND Railway World

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SATURDAY, SEPTEMBER 2, 1916.

DANGEROUS STARTING OF CARS.

Some importance attaches to the proceedings at an inquest held on August 25 as to the death of a labourer, 60 years of age, who died from injuries sustained through falling over the staircase-rail of a car. The widow of the deceased stated that he was brought home by a policeman who informed her that while he was getting on a car near Charing Cross Bridge it restarted, and he was thrown over the handrail into the road. The conductor, in his evidence, said he did not see the man get on the car. While inside taking fares he heard a noise of something rushing down the stairs, whereupon he gave the emergency ring. The deceased was then found in the roadway. In returning a verdict of accidental death the jury announced that they accepted the deceased's account of the occurrence, and they censured the conductor for collecting fares before the car had restarted from the stopping place. Taking the jury's view of the case, which was arrived at after consideration of the evidence, the car had stopped at a busy point after it had been about filled up at Waterloo Bridge. That the conductor did not see the deceased mount the platform and ascend the staircase shows that he was wedged inside the lower saloon collecting fares; and, judged by the instruction given on tramway undertakings generally, the conductor deserved the jury's censure because he did not come out on to the platform at the stopping place, which was the first pull up. The nature of the instruction is indicated in the second of a list of "Don'ts for Women Conductors," issued by the general manager of the Birmingham tramways and published in our issue of May 11 last. It reads: "Don't ring the bell for the car to start when inside. It is impossible to see that the platform is clear from inside, and it looks lazy." If one seeks to advance extenuating circumstances for the conductor, he is faced by the fact that the regulation is especially useful in rush traffic. Further, it is useless to have a rule that is only to be observed in time of light running. The conductor's anxiety, of course, was to make progress with the collection of the fares, a by no means light task now that fifteen passengers are allowed to stand in the lower saloon owing to the shortage of cars. Yet it is better to miss halfpenny and penny passengers than to involve the tramway authority in an action for heavy damages. There are two methods by which aid can be given to conductors during the busy hours. Before the war there was in London a collector on each deck until the end of a penny stage had been reached, when the top man would return to the Embankment and repeat his work. If women are available in sufficient numbers this system could be resumed generally, as was the case in the early days of the women conductors. From two aspects the licensing authority and the men's union are partly to blame for the fatality. Some years ago Scotland Yard forced the County Council to undertake a great expenditure for the purpose of reversing the staircases, on the plea that with the curve of the staircase near the driver's head his vision was obstructed. Only a slight improvement was effected by the alteration, which, moreover, has the effect of placing a passenger under the risk of falling either over or through the railings if he should stumble down the stairs. Under the old plan he would have fallen between the staircase and the car body. Then, again, three years ago the County Council desired to introduce youths as assistant conductors and to take charge of the bell, as is done at Manchester. Despite the opposition of the union, Scotland Yard managed to understand that this step would conduce to the safety of passengers, and they relaxed their rule as to the minimum age for issuing licences, in order to permit an experiment to be made on one route. Apparently no progress has since been recorded in the matter, and with the great demand for boy labour entailed by the war none can be looked for at present.

MAINTENANCE OF SERVICES.

Owing to the continued depletion of the male car hands of the Glasgow Corporation Tramways, the general manager has advised the committee to withdraw the cars at 11 p.m. instead of at midnight. This course, Mr. J. Dalrymple states, will be especially advisable in view of the strain imposed on the drivers by the approaching dark nights and the restricted lighting regulations. At present nearly one-third of the employees are working seven days per week, and 160 women are employed as drivers. Many more women are being trained in that capacity in order to fill vacancies caused by the calling up of the later groups of men for military service. Under these circumstances there is little hope that the Tramways Committee will pay heed to a request to receive a deputation from Springburn asking for the running of an all-night service.

Satisfaction is expressed with the manner in which a woman driver is performing her work on one of the Blackburn tramway routes. Several women conductors of good physique are being trained to undertake driving, and a number of discharged soldiers are also about to undergo instruction. It is stated, however, that Mr. J. H. Cowell, the general manager, will possibly have to advise a reduction of the services in order to meet the drain on the staff caused by men being called to the colours.

Rawmarsh Council has been informed by the manager of the Mexborough and Swinton Tramways Company that he is unable to run more cars owing to shortness of staff, some of the men working 80 and 90 hours per week. Overcrowding was unavoidable at times like the present, but it would be prevented as far as possible. In the Metropolitan area and in many other places the rules as to the number carried had been relaxed.

FEDERATION OF INDUSTRIES.

Mr. F. Dudley Docker has been appointed president, and Sir Wm. Peat, chairman, of the Federation of British Industries Association, which has been established as a central organisation of manufacturing interests.

Among the bodies that have been absorbed in the new association are the Institute of Industry, and commercial and powerful industrial groups in Manchester and Birmingham. The Institute of Industry has accordingly gone into voluntary liquidation, a condition being that the minimum amount of the fund to be raised under the new arrangement should be £100,000, which, as a matter of fact, has been greatly exceeded.

The main object of the new organisation is the investigation and carrying into effect of a definite line of policy in regard to the various matters affecting British industry, both now and after the war.

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NEW ADMINISTRATIVE POWERS.

The Police (Miscellaneous Provisions) Act, which came into operation on August 3, gives to the Home Secretary power to order occupiers of factories to make special provision for meals, rest rooms etc. The Act seems to have been instituted to meet special conditions of war work. In munitions and controlled factories the need has been experienced of a skilled supervisor to keep a guiding hand on the welfare of the workers, and in order to train them in Leeds a new department has been set up in the local university. It may be worth while for tramway authorities to consider whether the employment of women conductors comes within the Act. In many places special provision has been made for their requirements, extending to the provision of food and rest rooms.

A new Order in Council gives powers to the Board of Trade to enter premises when it is suspected that any person is laying up stocks of various kinds, metal of certain classes, textile fabrics, or certain raw materials, which will be of value to the enemy on the termination of the war. The Board is also given authority to investigate the books of any firm, new or old, in order to find out if there has been laid by any material not essential to the current requirements of business in the country, and if so to seize it for sale.

THREATENED U.S.A. RAILROAD STRIKE.

Supplies to the Allied countries may be considerably interfered with if the railway workers of the United States respond to the order of their union to cease work on Monday next if their demands are not granted in the interval. President Wilson has proposed an eight hours day to the railway executives, to become effective after the expiration of a year, in order to give the railways time to adjust themselves to it.

Leaders of the workers have refused President Wilson's demands that they should revoke the strike order, and the railroad presidents are leaving to prepare for the situation created by the strike.

On account of the gravity of the situation, President Wilson, on August 29, addressed a joint Session of Congress urging that legislation be immediately enacted to avert a strike. He said the present Bill provided for an eight hours' day for railway workers, authorised an inter-State commercial Commission to investigate wage increases in connection with freight rates, and provided a Commission to investigate disputes. The Bill prohibits strikes and lockouts during the inquiry and authorises the President to draft workers into the service for the military working of railways if necessity, in order to secure the conveyance of national necessities.

APPLICATIONS TO MILITARY TRIBUNALS.

Conditional exemption has been granted to two inspectors employed by Gloucester Corporation Tramways department.

In applying for exemption of two motormen and an electrician, Mr. H. Filling general manager and engineer, Accrington Corporation Tramways stated that the department were short of motormen, and that if these two were called up he would have to tram women to act as drivers. The Tribunal agreed to conditional exemption.

At Hull, a motorman, 34, married, with five children, applied to be granted exemption from non combatant duties. He had been granted exemption from combatant service as a conscientious objector. As he still remained in a certified occupation, the case was adjourned until he was taken out of the reserved list.

An Aberdeen motorman appealed on domestic grounds. He had been found fit for garrison duty only. A solicitor, who appeared for him, stated that applicant would not get any allowance from the Tramway department as he had only been in the service of the Corporation for six months. He was for two years a motorman, before that, but a serious illness necessitated his leaving the tramway service for 18 months. The Chairman: If his pay is not made up they are taking an extraordinarily narrow view of the matter. Temporary exemption was granted for two months. Another motorman appealed on domestic grounds, and was granted temporary exemption for three months.

Six months' exemption, with power to again appeal, has been granted to Mr. J. D. Evans, the cable tramway manager and inspector of nuisances at Matlock. The appeal was made by the Urban Council, who had released Mr. Foster, the former tramway manager, to enable him to work on munitions.

MISCELLANEOUS NEWS AND NOTES.

Request by Women Conductors. A deputation from the women conductors at Wolverhampton has asked for an allowance in lieu of summer clothing.

Fines of Twenty Shillings each were imposed at Birmingham on two men for having removed the chain placed across the platform of tramcars to prevent people from entering fully loaded cars.

Birmingham Omnibus Services. In order to provide for the needs of munition workers and to meet the restricted petrol supply, the motor omnibus services run by the tramways department in the Harborne district has been curtailed between 5 and 8 p.m.

Increased Car Fares in Tokio.—On July 1 an increase of one sen for single and return tickets took effect on the municipal tramways service in Tokio, Japan. This increase, together with a readjustment of charges to power consumers, led to great controversy before a settlement was arrived at.

To Link up Newcastle and Gateshead Tramways. An invitation has been accepted by Gateshead Corporation to send a deputation to the Newcastle Tramways Committee to discuss the proposed tramway across the High Level Bridge with a view to linking up the tramways of the city and Gateshead.

From Keighley to Bradford. Since the extension of the tramway from Nab Wood to Bingley, many Keighley people travel to Bradford by tramcar from Bingley after journeying to the latter place by railway. Besides the advantages of fresh air and sunshine, the tramcar ride effects a saving of threepence.

Belgian Railways and Electrification.—It is reported that a special commission has been appointed to consider the question of electrifying all the main lines of railway in Belgium. The Belgian administration has undertaken to put into working order the locomotives that were withdrawn into France before the German occupation.

Motor Lorries Supplementing a Russian Railway.—A message from Petrograd on August 27 stated that a complete service of motor-cars has been started between Petrograd and Archangel to supplement the railway. The road, over 600 miles in length has been newly constructed for the purpose. The cars, mostly heavy lorries, were supplied from the United States.

Tramway Construction after the War.—H.M. Trade Commissioner in New Zealand reports that the ratepayers of Palmerston North have agreed to a proposal to authorise the local Borough Council to raise a loan of £80,000, of which £60,000 will be devoted to an overhead trolley tramway and £20,000 to electric lighting installations. The undertakings, however, will not be commenced until after the war.

Dundee's Railless Trolley Cars. We observe from the annual report of Dundee Corporation Tramways Committee that the department still retains the two railless trolley cars that were used on the Clepington Road route, which was opened in September, 1912. It will be recalled that the service was withdrawn in consequence of the disinclination of the Corporation to put the road surface in a suitable condition.

The Future of Canadian Railways. A Commission is inquiring into the future of the railways of Canada, having regard to the following points: The general problem of transportation in the Dominion, the status of each of the three trans-continental railway systems, and the reorganisation of any of the systems or the acquisition thereof by the State, and, in the latter case, the most effective method of operation.

The Supply of Petrol. The rationing of petrol appears to have been unnecessarily restricted. Reports indicate that there are large supplies in the hands of the distributors and if additional supplies expected are received within the next two months, a more generous allotment of spirit to commercial users of motor vehicles may be anticipated. The regulation prohibiting pleasure tours by motor charabancs came into operation on September 1.

Axle and Tire Making in Penang. From the annual report of Mr. O. V. Thomas, engineer and manager, George Town, Penang, Tramways it appears that last year he succeeded in partly overcoming the difficulty of obtaining prompt delivery of materials and spare parts from England, especially with regard to steel axles and rolled steel tires. Mr. Thomas managed to get the axles made locally, and by the use of the wheel lathe the tire difficulty has, for the time, been surmounted.

Tramway Collections for Ambulances. The fund for providing ambulances to convey wounded soldiers from the railway stations to the hospitals is now being benefited by the collections made on the Birkenhead tramcars. The town is short of ambulance cars. Over a period of twenty-nine weeks the car collections have raised £1,741 for various war funds, thanks to the enthusiasm shown for the work by Mr. C. Clarke, the general manager, and the members of the Tramways Committee.

Alleged Excessive Speed. Replying to complaints made at the August meeting of Bolton Corporation as to alleged excessive speed at which some of the motormen were driving, Alderman J. Miles, chairman of the Tramways Committee, said the manager was doing everything possible to discourage dangerous driving. One of the members of the Council remarked that he recently took a trip to Leeds by car, and as regarded swaying and shaking he could say Bolton cars were A1.

Ticket Simplification at Oldham. In place of fourteen different types of ticket formerly issued on the Grains Bar route at Oldham, Mr. P. Priestly, the general manager, has re-arranged some of the distances and fares, thus necessitating fewer tickets. Hitherto many passengers have left the cars at Moorside and walked up to Grains Bar rather than pay 1d. for the short journey. Concessions of ½d. on 3d., 2½d. and 2d. rides have been made in order to induce people to book through to Grains Bar.

Russian Railway Requirements. It is estimated that 8,000,000 tons of rails, fish plates, girders for bridges, etc., will be required for new railways proposed to be constructed in Russia. An inter-departmental committee which has considered the position of the steel and iron industries in relation to the requirements for the proposed railways, has recommended the erection of new works in the coal mining districts. In order to provide the staff for the works, technical schools are to be organised without delay.

Edinburgh Tramwaymen's Distinctions. Among the Edinburgh Tramway Company's employees three men have been awarded the D.C.M., all in different fields of war. One of the cases was that of a conductor who won the medal at Gallipoli, another of the recipients was a driver, and the third was a trackman. Five hundred of the 1,200 pre-war employees have joined the colours. Nearly thirty have lost their lives. The company is still continuing their policy of making an allowance to their men who entered the national services.

Glasgow Action for Damages. Sums of £300 and £200 were asked for as damages for personal injuries by two persons who sued the Glasgow Corporation in the Court of Session on August 24. The pursuers were inside passengers in one of the defenders' tramway cars, which left the rails in Bilsland Drive, near the Forth and

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Clyde Canal Bridge, on January 2, and dashed against a stone wall embankment. Defenders, who admitted liability, tendered £100 and £50, with expenses, in settlement of the claims, and this offer the pursuers accepted.

Removal of Centre Standards.—After a satisfactory experiment in the substitution of side for central standards on the line between the Height and Pendleton, Mr. W. G. Holford, the general manager at Salford, has obtained the consent of the Corporation to the similar conversion of other sections. The wide thoroughfare from the Crescent to Chapel Street is now being dealt with. With the great increase of motor and horse-driven vehicles, the presence of standards in the centre of a roadway is recognised as dangerous, especially during a fog and the restriction of lighting consequent on air raids.

Montreal Tramways Company's Agreement.—A proposal has been made that the rights of the Montreal Tramways Company, which expire in 1922, shall be extended for a period of thirty years. The present suggestion differs from the previous proposal in that the company is now prepared to contribute $200,000 per annum to the city for the first five years, $300,000 for the following five, $400,000 for the next five, and $500,000 annually afterwards while the agreement remains in force. At present the company pays the city a percentage of its earnings. The Montreal Board of Control is now considering the proposal.

Charges Against Conductors.—In the prosecution of a conductor at Hull for embezzling two sums of a penny each it was stated that the accused issued two old tickets. A tramway timekeeper was on the car at the time, and as the prisoner's actions aroused his suspicions, he asked to see the way bill. This the conductor refused to show, and the official reported him. Accused was sent to prison for 30 days in the second division in order to prevent his pension of 8*s.* 0*d.* per week as an ex-soldier being taken away. An ex-conductor at Burnley was fined 10*s.* for not paying his fare. He used two discount tickets, which were taken out of a box.

Restricted Lighting on Tramcars in Scotland.—The windows of the Dundee Corporation tramcars have been obscured with a green liquid down to within a few inches of the bottom of each pane. Passengers complain that they cannot see when they are approaching their destination. Conductors will require to be well drilled in calling out the stopping-places if trouble is to be avoided. Consideration is being given by the police to the question whether the Glasgow cars should be further dimmed at night. At present the conductors complain that the lights are so shaded that they cannot see the printing on the tickets, while passengers cannot see to read.

Work After the War.—In order to meet the labour situation at the close of the war, the Local Government Board have asked local authorities to prepare a complete record of all work, public or private, to be undertaken in their districts, together with the requirements in the matter of capital and labour. This course has been taken because it is felt that in view of the magnitude of the questions involved there may be great advantage in beginning the collection of data necessary for the elementary consideration of the problems. The establishment of a Register of Work available and likely to be undertaken at the conclusion of the war is in contemplation.

Traffic Receipts and the Weather.—The fine weather experienced at the period that in time of peace would be known as the August bank holiday brought a great deal of pleasure traffic to the tramways throughout the country. The increased receipts continued during the short spell of sunny days that immediately followed, but when the wet spell set in there was a decline in the traffic. This was especially apparent at Glasgow in the week ended August 26, although the trade holidays were in full swing. The total receipts declined by £3,000 to £20,711 as compared with the preceding week. Up to August 26 the total receipts were £23,000 above the corresponding period of 1915, the number of passengers exceeding the previous record by 7,000,000. The first quarter of the Glasgow financial year ended on August 31.

A Hint for Glasgow Tramways Committee.—The accounts of the various municipal departments for the past year were adopted at the August meeting of the Corporation. Treasurer McMillan, referring to the accounts of the Common Good, said that the previous year there was a deficit of £62,000. They only got some £12,000 or £13,000 from the tramways. This year the tramways had provided a surplus of £43,548 to the Common Good, still leaving the working of the Common Good for this year with a deficit of £10,078. One of the items of expenditure was the sum of £7,328 for the raising of the city battalions. The first duty of the Corporation—and he hoped the tramways would assist—was to pile up a strong Common Good, so that they might be in a position to help those who required help. He hoped that in another year the tramways would be able to give a larger return.

Power Station Damaged in an Air Raid.—An inquiry into the death of a switchboard attendant was held on August 28 in an outlying district of London. The electrical engineer said that when warning was received of the approach of enemy aircraft on August 25 he immediately warned the workmen of impending danger. Shortly afterwards he heard bombs drop, and the place was illuminated by what he thought was a flare. Immediately afterwards there was a terrific crash, and the place went into darkness. The only light he had was that from a pocket torch. He subsequently found that a second man was wounded in the left shoulder blade, but he was not detained at hospital. Pieces of shrapnel had been found. The assistant foreman engineer spoke to seeing the man staggering towards him. He exclaimed: "I copped the lot." He had wounds in his hand, head, and face. The jury returned a verdict that death was due to shock, following upon the explosion of a bomb dropped from an airship.

American Motor-cars in India.—Over one thousand new motor vehicles have been put on the streets in Bombay in the last eight or nine months, while the 1915-16 report of the maritime trade of Sind states that among the imports of the year, motor-cars showed a rise of 85 cars, or 95 per cent. in number. This was brought about by the larger imports from the United States, amounting to 143 cars against 10 cars last year. Imports from the United Kingdom fell from 78 cars in 1914-15 to 31 cars in 1915-16. Motor-car imports into Calcutta in 1915-16 were valued at Rs. 41.83 lakhs, or greater by 16 per cent., of which Rs. 18.46 lakhs came from the United Kingdom and 17.54 lakhs from the United States. The number of motors registered in Calcutta during 1915-16 rose from 554 to 648; motor-cycles fell from 180 to 137 owing to many owners having gone to the front; motor-lorries rose to 16 and taxis decreased from 194 to 184. The import of motor vehicles into India from the United Kingdom has been stopped by the Government.

The Railway Wage Question.—Mr. J. H. Thomas, the railwaymen's representative, considers the outlook very serious. The men's demand for an increase of 10*s.* in wages is apparently to be pressed. In giving his views to an interviewer, Mr. Thomas explained his position as follows:—"Once an agreement is made it must be observed, but what I do say is that the circumstances which have now arisen are foreign to anything existing when the last agreement was made. The admitted increase in the cost of foodstuffs of 65 per cent. means that men getting the wages railwaymen are getting are unable to maintain a proper standard of efficiency. They are doing work as essential to the nation's interests as the men in the trenches, and therefore this question must be viewed from this standpoint as well. With those who suggest that this method is vicious in principle I agree. But my answer is that it is the only way. If the Government cannot control food prices there is no alternative to taking this step."

York Corporation Electric Omnibuses.—In a report on the first year's working of the Edison accumulator omnibuses, Mr. J. W. Hame, general manager and electrical engineer of the York Corporation Tramways, states that the three vehicles only run in districts in which there is not sufficient traffic for tramways. During the year ended March 31 last the omnibuses ran 65,470 miles, and the units used for charging (including all losses) were 80,661, or 1.23 units per mile. The working costs per mile (excluding interest and sinking fund) were 4½*d.*, but in this figure very little is included for tire maintenance. It is estimated that there will be about ¾*d.* per mile to add during the second year, making a total estimated working cost of 5¼*d.* per mile. So far the vehicles have been very satisfactory and there has been no trouble with the batteries. The electrical equipment generally has given entire satisfaction. Apart from the low working costs, it must be remembered that the revenue derived by the electricity department from the sale of energy for working the omnibuses amounted to £420 during the year.

PERSONAL.

Mr. W. B. Wemyss, who recently died in South Africa, emigrated from Kirkcaldy and secured employment on the Cape Town Tramways. He rose to become traffic superintendent.

Mr. W. O. Strangward, late secretary to the Prahran and Malvern Tramways Board, has been appointed secretary of the Melbourne Tramways Board, the annual salary being £1,200.

Mr. Algernon Law, C.B., Controller of Commercial and Consular Affairs at the Foreign Office, has been given the dignity of Knight-Commander of the Order of St. Michael and St. George.

Lieutenant H. A. Chamen, Bedfordshire Regt., who has died of wounds at the age of 22 years, is the younger son of Mr. W. A. Chamen, engineer and general manager of the South Wales Electrical Power Distribution Company.

Mr. H. A. Wilcox, manager of the Melbourne Tramways and Omnibus Company, has been appointed general manager to the Tramways Board which is taking over the company's undertaking. The salary is £2,500 per annum.

Lieutenant C. J. Orde, Royal Flying Corps, is engaged to be married to Lady Eileen Wellesley, younger daughter of the Duke of Wellington. Lieut. Orde is a son of Mr. Julian Orde, the secretary of the Royal Automobile Club, who has lost one son in the war.

Mr. H. E. Duke, Chief Secretary for Ireland, has resigned the chairmanship of the Board of Referees, appointed to hear appeals under the excess profits tax provisions of the Finance Bill, and will be succeeded by Sir Charles B. Renshaw, chairman of the Caledonian Railway Company.

Jogendra Nath Sen an assistant engineer in Leeds Corporation electricity works, has been killed in action in France, where he was serving as a private in a Yorkshire battalion, following a few months' service in Egypt. This Hindu patriot took his B.Sc. degree in 1913 and had been in England since 1910.

G.E.C. Directorate.—New directors of the General Electric Company are Messrs. M. F. Armstrong, G. H. Ide, and M. Solomon. Mr. Ide, who is manager of the metal works, has been with the company for twenty years, while Mr. Solomon, manager of the carbon works, has seen upwards of fourteen years' service.

CONTRACTS AND ORDERS.

Aberdeen Tramways Committee have placed a contract with the British Thomson-Houston Company for the supply of two traction motors.

Walthamstow Council has allotted contracts as follows:—British Thomson-Houston Company, extra high-tension switchgear; General Electric Company, low-tension switchgear; Bruce Peebles and Company, motor converter.

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FINANCIAL REPORTS AND MEETINGS.

W. T. Henley's Telegraph Works Company announce an interim dividend on the preference shares at the rate of 4½ per cent. per annum, less income tax, and on the ordinary shares at the rate of 10 per cent. per annum, less income tax, for the half-year ending June 30 last.

Montreal Tramways Company.—For the year ended June 30 last this company paid a dividend of 10 per cent., as compared with 7½ for the year 1912-13. The gross earnings increased by $84,533. There was a decrease of $6,943 in expenses of operation. The net gain was $91,477, or equal to 3¼ per cent. The expense ratio to gross earnings declined by nearly 1 per cent. to 56 per cent. After providing for the dividend of 10 per cent. on the larger amount of capital there is a surplus of $185,120, or $60,500 higher than for the preceding year. $313,576 was debited to contingent renewals account. The company has been included in the Treasury list of dollar securities that the Government are controlling by borrowing or purchase. Holders who deposit their securities gain ½ per cent. more interest.

The Position of Dublin and Blessington Steam Tramways.—The directors of this company have informed Dublin and Wicklow County Councils that they will not be responsible for the working or maintenance of the line from September 1, 1916. At a meeting of the first-named council Mr. J. Mahoney (chairman), stated that as the company had lost money for four consecutive half-years the tramways now became vested in the County Council. If they allowed the tramways to be closed they would lose £800 a year, and the smallest guarantor could compel them to run it. It appeared that owing to the action of Wicklow County Council the Chief Secretary for Ireland had not yet granted the application for an order to hand the line over to the two county surveyors. The Council agreed to leave the matter in the hands of the clerk.

George Town (Penang) Tramways.—The annual report of the municipal tramways and electricity departments of George Town Penang, shows that the revenue was $141,944, of which $135,474 was derived from passenger traffic and $5,439 from the carriage of goods. The operating costs were $95,807, leaving a gross balance of $46,139. This shows a gross profit of 8.7 per cent. on the capital outlay. After the payment of capital charges and allocating $19,508 to depreciation and $7,000 to renewals and reserves, there was a net deficit on the year's working of $5,672. The mileage in single track is 11½. Car miles totalled 502,731, and the number of passengers was 5,177,874. As the working costs are low, Mr. O. N. Thomas, the engineer and manager, suggests that the fares shall be raised on some sections in order to meet the deficit. The ordinary three-cent and two-cent fares at present charged represent an average cost to the passenger of 2.69 cents (a little over three farthings) per mile.

National Electric Construction Company, Ltd.—In their report for the past year the directors state that the working of the various undertakings resulted in a loss of £3,050, after providing £3,750 for debenture interest and £1,550 for debenture redemption. The profit on contracts completed and in progress was £2,052 against £4,324, and the revenue from investments decreased, such revenue (less interest paid) being £3,302 against £4,386. There was a loss of over £2,000 in connection with an accident on the Dewsbury and Ossett tramway undertaking in October last. (The accident was due to a car getting beyond control on a descent, leaving the rails and damaging a building.) Half of the loss is apportioned to the present accounts. The board add that but for this accident the profit from the Dewsbury, Ossett and Soothill Nether Tramways would have been a record. In the case of several of the undertakings in which the company is interested, particularly those at Rhondda, Mexborough, Swinton and Musselburgh, the shortage of labour has been acute. The price of fuel and of materials required for repairs has increased enormously.

Bombay Tramways and Electric Supply Company.—At the annual meeting, held at Bombay, Sir Sassoon David presided. In moving the adoption of the report, the chairman said this was the first occasion that the general meeting of the company had been held in India. Notwithstanding the serious handicap of the war, both the gross and net revenue of the undertaking had continued on the upward grade. For the year under review, as compared with the previous year, the former recorded an advance of Rs. 1,23,000 and the latter an advance of Rs. 1,00,400. This comparison was with a year, seven months of which were prior to the war. If they compared the same figures with the year 1913, a year of peace, then the increase in net earnings amounted to not less than Rs. 3,40,000. These figures were testimony to the soundness of the business, and to the care and prudence with which it was administered. After meeting all fixed charges, and defraying all the operating expenses and maintenance charges, and making the appropriations to various funds, the balance of net profit justified them in recommending a dividend at the rate of 7 per cent. per annum on the ordinary shares. This would leave £9,602 to be carried forward to this year's revenue as against a sum of £8,326 brought in last year.

Brazilian Traction Light and Power.—The report of the Brazilian Traction Light and Power Company for the year ended December 31 states that while the combined earnings of the companies in Brazilian currency have fully realised the expectation of the Board, being considerably greater than those of the previous years, the result is not so satisfactory when such earnings are converted into Canadian currency. For some years prior to the outbreak of the European war, the value of the milreis for sight bills on London was approximately 16 pence. During the latter part of 1914, however, the average value fell to approximately 13 pence, and in 1915 it showed a further depreciation to an average of approximately 12½ pence. Converting the earnings during 1915 at the average rate prevailing prior to the war, the net revenue, in Canadian currency, would be increased by over $3,000,000. The revenue of the company in Canadian currency resulting from the year's operation was as follows:—Revenue from securities owned and under contracts with subsidiary companies, $5,330,102, and from interest on advances to subsidiary companies, $273,083, a total of $5,612,876. Deducting general and legal expenses, administration charges and interest on loans, amounting to $218,074, and the dividends paid on the preference and ordinary shares, there remains a surplus carried forward of $545,421. During the first half of 1915, dividends on the ordinary shares at the rate of 1½ per cent. each were paid on March 1 and June 1 respectively. As, however, contrary to expectations, the exchange value of the milreis continued to fall, the Board decided to limit the dividends payable on September 1 and December 1 to ½ of 1 per cent. each, making a total dividend of 4 per cent. for the year. Although rigid economies have been effected, the cost of operation and maintenance has been adversely influenced by the rise in the price of materials and by the enormous advance in ocean freights. With a return to normal conditions the revenue should be not only equal to that obtained prior to the war, but should show a considerable and steady increase. Conditions generally in Brazil are showing distinct signs of improvement. A quarterly dividend of 1½ per cent. has been declared on the preference shares.

Dundee Corporation Tramways.—Considering the war, the financial result of the working of these tramways during the year ended May 15 last is very satisfactory. The undertaking has recovered from the slight set-back that it received in the preceding year, as will be seen from the appended table setting forth the principal items in the accounts for the past three years. Although having to contend with increased charges for energy and materials, besides paying more than double the sum required for war allowances and bonus in the previous year, £5,200 was added to the reserve fund. £8,188 was expended on general repairs and maintenance, an increase of £744 on 1914-15, and only £1,288 less than in the last pre-war period. The car mileage increased by 27,542 miles, passengers by 873,500, and the receipts by £3,067. During the year the rolling-stock was increased by the addition of four single truck top-covered cars. In August, 1915, the department took over and began working 1,514 yards of double line that previously belonged to the Dundee, Broughty Ferry and District Tramways Company, and a scale of through fares to West Ferry and Broughty Ferry was agreed to in November last.

	1916-15.	1915-14.	1914-13.
Capital expenditure ...	£383,486	£371,145	£302,110
Amount outstanding ...	£270,844	£274,383	£272,053
Reserve or renewals fund ...	£97,804	£92,694	£82,966
Traffic revenue	£70,455	£66,552	£67,754
Total revenue	£71,040	£68,273	£69,504
Working expenses ...	£48,431	£43,358	£43,438
War allowances and bonus	£2,873	£1,110	—
Gross balance	£23,500	£24,915	£26,066
Net profit	£9,777	£8,902	£10,713
Passengers carried ...	19,620,640	18,753,140	19,042,344
Fare per passenger ...	.861*d.*	.851*d.*	.853*d.*
Car mileage	1,415,887	1,388,345	1,387,980
Units per car mile ...	1.912	1.847	1.815
Power cost per car mile ...	2.061*d.*	1.847*d.*	1.815*d.*
Receipts per mile of single track	£2,348	£2,345	£2,387
Traffic receipts per car mile	11.942*d.*	11.504*d.*	11.715*d.*
Expenses per car mile, excluding power ...	6.148*d.*	5.648*d.*	5.666*d.*
Ratio of working expenses	67.3%	63.5%	62.49%
Total track mileage ...	10¼m.	15⅝m.	15⅝m.
Number of cars in stock ...	76	72	68

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-four of the principal tramway undertakings in the United Kingdom for the week ended August 19 give total receipts of £200,931, or £10,500 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or sixty-nine more than for the corresponding week. The receipts this year were at the rate of £90 2s. per mile of single track, and last year at the rate of £83 19s., thus showing an increase for the week of £6 3s. per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27, 1914	Cash. Aug. 31.	A Week Ago.
5%	5%	Alabama Traction, 5% 1st. Mt.	—	67	66	68¾
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4¾	73/9	73/9
4%	4%	Do. 4% Deb. ...	100	91	74½	74¾
4½%	4½%	Do. 4½% Deb. ...	100	98½	75½	76
5%	5%	Do. 5% Deb. ...	100	96	74½	74½
1/-	7d	Auckland Elec. Trams. Ord. ...	1	1⅜	20/6	20/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102⅛	93⅛	93⅛
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11½	10⅜	10⅜
4½%	4½%	Do. 4½% Deb....	100	96	83	83
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	92	92
$¼	$1	Brazilian Trac. & Power Ord. ...	$100	66	62	61⅜
$1½	$1½	Do. 6% Cum. Pref.	$100	97	92	93½
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7⅛	6⅛	6⅛
2/6	2/6	Do. 5% Cum. Pref.	5	5	85/-	85/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92	93
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	50½	47
5%	5%	Do. Pref. Ord....	100	106	48	48
5%	5%	Do. 5% Cum. Pref.	100	103	71	67½
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	80½	80½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	67½	67
—	£3	Brit. Elec. Trac. Ord.	100	—	36	35½
—	6%*	Do. 6% Cum. Part Pref. ...	100	—	80½	80½
5%	5%	Do. 5% Deb.	100	92	86½	84½
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	70	70
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	92½xd	92½
3/-	6/6	Calcutta Tramways, Ord. ...	5	7½	6⅞	6⅛
1/3	1/3	City of B.A. Trams.	5	5½	90/7½	90/7½xd
5/-	4/-	Dublin United Trys 6% Pref. ...	10	12	10⅝	10⅝
5%	5%	Hong Kong Trys. 5% Mt. Dbs. ...	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	½	2/1½	2/1½
6/-	6/6	Lanarkshire Trys. Co.	10	10½	9⅝	9⅝
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9½d.	9½d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	1⅛	2/2	2/3
6d.	6d.	Do. 5% Pref.	1	5/16	8/-	8/6xd
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	62½	62½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88½	88½
5%	5%	Do. 5% Inc. Deb.	100	88½	70½	79½xd
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	47½	47½
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	96/6	96/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	66½	66½
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	69½	69½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	78	78
$1½	$1½	Mexico Trams. Common ...	$100	70	29⅞	29
5%	5%	Do. 1 Mt. 5% G.B.	—	84	41½	42½
6%	6%	Do. 6% Mt. Bds.	100	76	35½	34
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	96½	96½
4½%	4½%	Do. 4½% Stg. Debs.	100	99	96	94½
1/2*	1/2*	National Steam Car	1	½	18/9	18/6
9½d.*	9½d.*	New General Traction	1	¾	7/9	7/9
6d.	8½d.	Northern Gen. Trams. Ord. ...	1	⅞	15/4½	15/4½
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	66/-	66/-
5%	5%	Do. 5% 1st Deb.	100	89½	73½	73⅞
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80½	80½xd
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	½	11/-	10/4½xd
10d.	8d.	Provincial Trams. Ord.	1	½	16/6	16/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84	84
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	91⅜	91
5%	5%	1st. Mt. 5% 50 yr.	100	89½	82⅝	82½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	91½	91½
5%	5%	Do. 5% Perp. Deb.	100	99½	82½xd	82½
—	—	Singapore Elec. Trams	5/-	¼	4/10½	4/10½
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	96½	96½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	82½	82½
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	94½xd	93½
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	78½	78½
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	¾	9/3	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	90/-	90/-
—	—	Metropolitan Dist. Ord. ...	100	21¾	18	18
—	—	Undgd. Elec. Rys. of London ...	10	2½	39/-	38/9
		Do. "A"	1/-	¾	6/-	6/3
4½	4½	Do. 4½% Bds of 1933 Rd.	—	99	101½	102½
6	6	Do. 6% 1st Cum. In. Db.	100	114	108	107½
6	6	Do. 6% In. Bonds Rd. ...	—	88	92½	92

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1915	1916	Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	Aug. 26	£48,885	£48,713	35	£1,724,056	— £9,636
Auckland (28 days)	July 28	20,408	21,507	4	21,507	— 646
Ballarat and Bendigo	June 18	2,092	2,793	12	10,375	+ 878
Brazilian Traction Mlrs.	July	6,703,000	7,195,000	31	47,145,000	+2,757,890
Brisbane	July	31,150	32,880	31	227,230	+ 17,580
British Columbia $	June	498,093	529,078	52	6,602,624	— 703,939
Buenos Aires Lacroze	July 1	41,460	38,439	5	38,439	— 3,021
Burmah Tramway ... Rs.	July 29	3,726	3,437	52	...	+ 3,920
Calcutta Rs.	Aug. 26	66,852	65,092	35	2,296,320	+ 101,598
Cape Town	July	...	13,357	...	...	...
Carthagena & Herrerias	July 30	2,157	2,371	31	18,740	+ 5,935
Cordoba	May	14,494	14,868	9	28,921	+ 818
East India	July	2,231	2,220	52	25,370	+ 1,586
Hong Kong $	July 29	11,938	17,172	33	420,128	+ 95,286
Kalgoorlie	May	3,269	2,921	21	12,437	— 1,035
La Plata	July	4,054	3,909	31	29,835	+ 15
Lima	Apr.	31,633	33,556	18	134,629	+ 5,614
Lisbon Escu.	June	...	202,451	...	...	...
Madras (2 weeks)	Aug. 15	30,869	32,269	33	469,380	+ 33,100
Manila $	Apr.	117,450	124,350	...	505,381	+ 16,765
Manaos Rs.	May	...	152,854	...	...	...
Melbourne	May	...	69,275	...	...	...
Montevideo	July	25,161	25,220	39	266,288	+ 14,435
Pernambuco	Aug. 27	2,719	2,996	34	101,562	— 4,228
Peruvian $	July	724,838	835,430	5	835,430	+ 110,592
Port Elizabeth	July	...	3,166	...	...	...
Rangoon	July	4,629	4,357	31	32,938	— 1,436
Shanghai $	July 26	21,441	27,772	...	...	...
Singapore $	July 22	10,820	12,338	29	359,661	+ 39,830
Toronto $	June	787,558	884,491	26	5,335,199	+ 525,136
Winnipeg	June	255,549	254,686	26	1,701,474	— 50,782

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Name.	Week ended	Latest Return. 1915	1916	Incr. or Dec.	Wks.	Aggregate. 1916	Incr. or Dec.
Aberdare U.D.C.	Aug. 22	£364	£446	+ 82	21	£8,135	+ £816
Aberdeen Corporation	,, 23	1,961	1,987	+ 26	12	23,781	+ 697
Accrington Corp.	,, 23	569	629	+ 60	21	12,378	+ 392
Ayr Corporation	,, 26	523	1,003	+ 480	15	8,209	+ 500
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	,, 27	1,462	1,613	+ 151	21½	32,949	+ 2,924
Birmingham Corp.	,, 26	15,105	16,900	+ 1,795	21	349,440	+ 57,659
Do. Motor Omnibuses	,, 26	951	1,067	+ 116	21	21,275	+ 2,837
Blackburn Corp.	,, 16	1,296	1,358	+ 62	20½	26,966	— 996
Blackpool & Fleetwood.	,, 16	1,899	2,374	+ 475	34	28,954	+ 2,603
Blackpool Corp.	,, 17	4,006	6,394	+ 2,388	20	46,603	+ 8,484
Bolton Corporation	,, 22	2,860	3,038	+ 178	22	62,768	+ 3,882
Bournemouth Corp.	,, 30	2,704	2,969	+ 265	22	53,376	+ 2,989
Bradford Corporation	,, 19	7,139	7,923	+ 784	20	140,228	+ 1,769
Brighton Corporation	,, 27	1,602	1,898	+ 296	21½	28,635	+ 2,494
Bristol	,, 25	10,222	11,085	+ 863	34	339,560	+ 13,824
British Elec. Federa'n	*	...	...	...	...	...	...
Burnley Corporation	,, 26	1,558	1,703	+ 145	22	37,771	+ 1,790
Burton-on-Trent Corp.	,, 27	298	319	+ 21	21	5,843	— 552
Bury Corporation	,, 20	1,501	1,568	+ 67	21½	30,215	+ 1,200
Cardiff Corporation	,, 26	3,005	3,365	+ 360	21	64,333	+ 4,882
Chatham & District	,, 24	1,426	1,498	+ 72	34	41,110	+ 1,649
Chesterfield Corp.	,, 17	275	306	+ 31	20	5,749	+ 215
Colne Corporation	,, 24	234	264	+ 30	...	...	...
Cork Electric	,, 24	562	580	+ 18	34	17,178	+ 143
Croydon Corporation	*	...	...	...	...	...	...
Derby Corporation	Aug. 26	1,126	1,287	+ 161	21½	24,685	+ 1,496
Dover Corporation	*	...	...	...	...	...	...
Dublin & Lucan	,, 25	177	205	+ 28	8	1,586	+ 196
Dublin United	,, 25	6,551	7,073	+ 522	34	202,854	— 3,847
Dundee City	,, 23	1,445	1,491	+ 46	14½	20,389	+ 585
East Ham Corporation	,, 26	1,389	1,406	+ 17	21½	28,548	+ 65
Exeter Corporation	,, 25	462	475	+ 13	21	8,606	+ 58
Glasgow Corporation	,, 26	21,341	20,766	— 575	12⅔	289,693	+ 23,133
Glasgow Subway	,, 26	979	799	— 180	34	38,931	+ 3,751
Glossop (U. Elec. Supp.)	,, 26	157	143	— 14	35	4,792	+ 480
Halifax Corporation	,, 22	2,526	2,753	+ 227	20⅓	48,751	+ 670
Do. Motor Omnibuses	,, 22	47	63	+ 16	20⅓	1,045	— 55
Hastings & District	,, 25	1,644	1,909	+ 265	34	34,755	+ 1,771
Huddersfield Corp.	,, 26	2,782	3,044	+ 262	21	63,805	+ 5,787
Hull Corporation	,, 26	3,092	3,157	+ 64	21	66,859	+ 1,007
Ilford U.D.C.	,, 19	685	741	+ 56	20	14,360	+ 726
Ilkeston Corporation	,, 30	142	157	+ 15	22	3,133	+ 159
Ipswich Corporation	,, 26	717	590	— 127	21	11,883	— 396
Isle of Thanet	,, 26	1,063	987	— 76	47	16,656	— 2,942
Kilmarnock Corp.	,, 26	168	188	+ 20	14⅔	2,640	— 16
Lanarkshire	,, 24	2,173	2,631	+ 458	34	77,599	+ 12,174
Lancashire United	,, 23	1,043	2,036	+ 93	34	60,754	+ 2,382
Leeds City	,, 26	9,625	10,610	+ 985	22	212,238	+ 18,560
Leicester Corporation	*	...	...	...	...	...	...
Leith Corporation	,, 26	753	900	+ 147	14⅔	13,373	+ 1,590
Leyton U.D.C.	,, 17	1,912	1,868	— 44	20	34,363	+ 555
Liverpool Corporation	,, 26	14,083	15,106	+ 1,023	34½	478,451	+ 23,913
Llandudno & Colwyn B.	,, 18	706	877	+ 171	37½	12,425	+ 82
London County Council	July 19	46,999	48,584	+ 1,585	15½	755,621	+ 98,068
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation	*	...	...	...	...	...	...
Maidstone Corporation	Aug. 24	244	244	nil	21	4,695	— 152
Manchester Corp.	,, 26	18,255	19,575	+ 1,320	21	405,742	+ 23,200
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	July 29	230	258	+ 28	17½	3,744	+ 280
N'castle-on-Tyne Corp.	Aug. 26	6,566	6,996	+ 430	21	141,002	+ 4,555
Newport (Mon.) Corp.	,, 26	926	1,048	+ 122	21	20,160	+ 1,670
New St. Helens & Dist.	,, 23	1,204	1,195	— 9	8	9,725	+ 456
Northampton Corp.	,, 25	711	762	+ 51	21	15,107	+ 1,363
Nottingham Corp.	,, 24	3,949	4,213	+ 264	21	82,265	+ 1,586
Oldham Corporation	,, 27	2,510	2,788	+ 278	22	56,768	+ 3,658
Portsmouth Corp.	,, 19	3,087	3,422	+ 335	...	...	...
Preston Corporation	,, 23	975	1,177	+ 202	20⅔	22,921	+ 2,454
Provincial	,, 26	2,919	3,012	+ 93	47	107,607	+ 5,801
Reading Corporation	,, 24	872	991	+ 119	20⅔	17,846	+ 791
Rhondda Tramways	,, 17	1,187	1,366	+ 179	33	41,371	+ 3,119
Rochdale Corporation	,, 26	1,715	2,029	+ 314	21½	39,583	+ 1,478
Rotherham Corp.	,, 30	1,200	1,740	+ 540	21⅔	33,253	+ 7,969
Salford Corporation	,, 28	5,319	5,660	+ 341	20⅔	120,666	+ 6,841
Sheffield Corporation	,, 27	9,311	11,150	+ 1,839	22½	232,972	+ 38,000
Southampton Corp.	,, 23	1,779	1,969	+ 189	20⅔	34,879	+ 2,786
Southend-on-Sea Corp.	,, 23	1,288	1,860	+ 572	21	21,626	+ 1,883
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	,, 26	922	952	+ 30	21½	18,031	+ 648
Sunderland Corp.	,, 27	1,622	1,729	+ 107	21	35,376	+ 2,229
Sunderland District	,, 23	667	716	+ 49	43	25,992	...
Swindon Corporation	,, 23	222	242	+ 20	20⅔	4,276	+ 44
Torquay Tramways	,, 24	933	1,098	+ 165	34	19,620	+ 1,080
Tyneside Trys. & Tmrds.	,, 16	678	789	+ 111	7	5,176	+ 429
Wallasey Corporation	,, 26	1,536	1,719	+ 183	21½	30,997	+ 1,584
Walsall Corporation	,, 21	838	928	+ 90	35	28,023	+ 2,855
Walthamstow U.D.C.	,, 26	1,169	1,296	+ 127	21	24,374	+ 3,370
Warrington Corp.	,, 10	459	535	+ 76	19	9,252	+ 642
West Ham Corporation	,, 24	3,737	3,374	— 363	20⅔	69,123	+ 2,190
Wigan Corporation	,, 24	1,574	1,673	+ 98	21	35,321	+ 2,952
Wolverhampton Corp.	*	...	...	...	...	...	...
Yorkshire (W. Riding)	,, 27	1,736	1,983	+ 247	35	61,091	+ 5,495

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THE

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

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WEEKLY LIST OF TENDERS INVITED.

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The Directors do not bind themselves to accept the lowest or any tender.

T. MORRISON,
Secretary.

Secretary's Office,
Amiens Street Terminus,
Dublin, August 25, 1916.

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1,856	,,	0.15	,, ,,	,,	,,
440	,,	19/16	S.W.G.	,,	,,
2,000	,,	7/14	,, ,,	,,	,,
1,000	,,	7/16	,, concentric	,,	,,
1,760	,,	0.007	sq. in 3 core	,,	,,
400	,,	0.05	,, ,,	,,	,,

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Applicants must have had previous experience in H.T. supply, and preferably with Diesel Engine Plant.

Applications, accompanied by not more than three recent testimonials endorsed "Chief Engineer," must be delivered to the Borough Electrical Engineer, Wray Common Road, Reigate, on or before noon of Wednesday, the 13th day of September next.

By Order,
ALFRED SMITH,
Town Clerk.

Municipal Buildings,
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August 28, 1916.

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SATURDAY, SEPTEMBER 9, 1916.

THE EXTENSION OF RAIL LIFE.

With rails high in price and difficult to obtain in large quantities, an invention that will enable worn rails to be given a renewed lease of life is of immeasurable value. The Woods-Gilbert rail planer, to which we have referred from time to time, is an Australian innovation, which was introduced to the attention of tramway engineers in that country a few years ago. It has now accomplished sufficient work, both in that country and in England and Wales, to enable tramway authorities to judge of its utility. An examination of the contracts that have been and are being fulfilled show that a large amount of successful work must already be credited to the invention. At Melbourne ninety miles of rail were remodelled, which entailed the milling out of the grooves and the cutting down of the guardlip, and at the annual meeting of the Tramways Company in 1912 the chairman testified that the work had been satisfactorily performed, and had resulted in the smooth running of the cars and a decrease in the expenditure on car and track maintenance. Brisbane Tramways Company in the same year had 6,775 feet of tread cut out and 2,975 feet of groove, and here also the result was a "decided improvement in the comfort of the travelling public," and the elimination of the hammering that the equipments were subjected to under former conditions. An improved type of the machine treated 40,757 feet of rail at Adelaide with complete satisfaction to the tramway authority. On this and the Sydney undertaking the planer is regarded so highly that it is employed continuously for the treatment of corrugations and joints, thus enabling a true surface to be maintained. The machine's first achievement in this country was at Oldham, where the Electrical Federation had the grooves of the rails of their tramway in that district deepened. Similarly satisfactory results are reported from the Isle of Thanet, Cardiff, Wigan, and Bexley. When the appliance was brought to the attention of Wigan Corporation they decided that a deputation should visit Cardiff and view the results before an order was placed for extensive treatment of their rails. Other undertakings have since then placed contracts, which are now being executed. It is an advantage of the treatment that it may be carried out at night, that the machine requires only three operators, and that it can be speedily removed from the track to enable cars to pass. There is no need to dilate upon the injurious effect of corrugation upon the track and rolling-stock. While the problem of preventing its appearance is as yet unsolved, there can be no question of the desirability of preventing its aggravation. For this purpose the rail planer would seem to be invaluable, for it gives the best economic results when it is set at work before corrugation becomes very pronounced. But the principal advantage of the system is that by its means the life of rails may be extended for several years. The worn surfaces are cut away and the tread, groove, and lip are left in such a condition that the effect is similar to that obtained by rail renewal. In view of the rapidly worsening condition of much tramway track at the present time, the rail planer system ought to receive the patient investigation of those responsible for track maintenance. The Municipal Tramway Conference in London this month will afford members a timely opportunity for inspecting the work now being done at Bexley, and it may be hoped that arrangements will be made for a visit of inspection.

MANCHESTER FARE PROSECUTION.

At Manchester Police Court on September 6 a young man was charged with attempting to avoid payment of his fare on a tramcar. The solicitor for the defence said the defendant was a young man of good character. He was taking his fiancée on a day's outing to Altrincham, and his contention was that the conductor had never asked for the fares. She did call "Tickets, please," and defendant put out his hand with half a crown in it, but the conductor omitted to take the money. There was no rule or regulation in a car cautioning a person as to when and at what point he should tender his fare, and he submitted that a very important point to consider was, "When does the potential criminality of travellers on tramcars begin?" In imposing a fine of 20s., the Bench said if everyone had to be asked definitely for his fare the Corporation would have to have an enormous number of additional conductors. It was shown that the conductor had been among the passengers at least nine times. Notice of appeal was given.

Satisfactory results are following the exhibition in cars in the north-eastern and south-western areas of the Metropolis of placards pointing out the penalty incurred by persons who are found travelling without having tendered the fare.

APPLICATIONS TO MILITARY TRIBUNALS.

At Rotherham the tramways department appealed for the exemption of 20 motormen and shed men. Only five had undergone medical examination, and none of these had passed for general service. Conditional exemption was granted to them. The remaining men were ordered to submit to medical examination before the next sitting of the Tribunal.

On the ground that they were urgently required to maintain the motor omnibus services, absolute exemption was applied for at Oxford for 26 employees of the Electric Tramways Company by Mr. H. H. Tyler, the general manager. Their ages ranged from 23 to 38 years, and one was Mr. D. Campbell, the traffic superintendent. When the company made the first application in June last there were 35 drivers. Since then eight rejected men had been obtained and trained as drivers, one of whom had since been passed for sedentary work, and 18 had left, leaving the company with the present staff of 25 drivers. But for the fact of the supply of petrol having been cut down nearly 50 per cent. and the consequent reduction in the number of omnibuses running, the company would be much more seriously embarrassed than it was. At present, owing to shortage of drivers, men were working overtime, and the inspectors frequently had to act as drivers. Regarding Arthur Grace (23), night foreman in charge of the workshops, it was said that his duty was to superintend the repairs. His services were of vital importance, as he was the only man available for such work and could not be replaced. The military representative asked if the manager could not undertake the work of the traffic superintendent, and Mr. Tyler replied: "Certainly not." Captain Fox urged that as Grace was single he ought to go into the army. It seemed hard to think that the whole running of the undertaking should depend on a man who was earning £3 a week. Mr. H. Holmes, engineer, said of the 23 men of whom Grace was in charge, four were semi-skilled and four were washers and cleaners. They had applied to the Labour Bureau ever since the war began to get skilled men, without success. All the men were exempted so long as they remained in their present occupation, except three (whose cases were adjourned for a month for the men to be examined by the Medical Board) and Grace was exempted for two months.

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The Isle of Thanet Electric Tramways Company applied for the continued exemption of eleven of their employees—six single men and five married men. All the men concerned had previously been considered in certified occupations, but Colonel Cates explained that no men were now starred. Every man must now get a certificate. Mr. J. A. Forde, engineer and manager, asked for the exemption of six single men employed as supervisors of sub-stations, assistant charge engineers, motormen, and permanent-way labourer. The married men were two inspector-motormen, storekeeper and two motormen. The company could not spare another man. They had 60 men on active service. In 1914 he had 270 men, and now it had been reduced to 119, which was made up by 91 men, 3 boys, and 25 women. During last week they worked between them an equivalent of 79 days and 10 hours' overtime. Women could not drive the class of car used in Thanet. He doubted if the Board of Trade would sanction women drivers there, owing to the nature of the permanent-way. With the one exception, it was decided to adjourn the cases for a month, so as to enable the military and company to co-operate. The men under 30 were directed to go before the Medical Board in the meantime. Mr. Forde mentioned 20 of the employees previously rejected had now to undergo a further examination

EMPLOYEES' HOURS AND BONUS.

Glasgow Tramways Committee has agreed to recommend that for the duration of the war, the working hours of the department's employees be fixed as follows:—Drivers and conductors, 54 hours per week; controllermen and truckmen, 54 hours; sawyers and wood cutters, 54 hours; permanent-way labourers, 56 hours; mains and cables (labourers), 56 hours; red leaders, 56 hours; and car works (labourers and handymen), 54 hours. It was also agreed to recommend that these employees be paid time and a half for the extra hours worked between the present weekly total of 51 hours and the proposed working week. Another recommendation adopted was that during the war male employees in the classes referred to receive a bonus of 2*s*. per week and women a bonus of 1*s*. per week.

Salford Tramways Committee has reported on the proposal to give a further war bonus to the tramway employees. The project, they state, will mean the giving of a sum ranging from 1*s*. to about 4*s*. This increased payment, the committee point out in a special report, represents a further addition to the operating costs of £2,774 per annum for the men now working, and £1,804 per annum for those in the forces, a total of £4,588, which, added to the war bonus at present paid, means a total charge under that heading of £9,878 6*s*. per annum. The chairman (Alderman Linsley) states that probably the payment of that sum "may prevent the department from being in a position at the end of the financial year to hand over to the borough fund in relief of rates the amount they had already promised." At the meeting of Salford Council on September 6, when the increased payment was agreed to, Alderman Linsley said the increase would be, to youths under 18, 2*s*. per week war bonus, instead of 1*s*.; to males over 18 who were not householders, 3*s*. instead of 1*s*. 6*d*.; to male householders whose wages did not exceed 37*s*. 6*d*., 4*s*. 6*d*. per week instead of 2*s*. 6*d*.; and to those receiving over 37*s*. 6*d*. and less than 42*s*. an amount that would make their total wages, including war bonus, 42*s*. The increased payment represented a further addition to the operating costs of £2,774 a year for the men now working, and £1,804 a year for those in the forces, a total of £4,588. Added to the war bonus at present being paid, that represented a total charge under that heading of £9,878. There was grave doubt whether, after meeting those charges, the committee would be able to keep their promise to the Finance Committee with regard to the relief of rates. Councillor Hampson said it seemed to be a waste of public money to add to the already generous contributions which were made in respect of the men who had gone to the war.

Dublin Tramways Company's men are asking for an increase of the 1*s*. a week bonus to the highest paid employees and of the 1*s*. 6*d*. a week bonus to lesser grades.

West Hartlepool Corporation has increased the war bonus to municipal workmen by 1*s*. per week, making a total bonus of 4*s*., or 2*d*. in the pound on the rates.

INATTENTION TO INSTRUCTIONS.

Judging by the evidence given at an inquest on a woman conductor at Manchester, constant supervision is necessary in order to see that attention is paid to instructions against dangerous practices. This woman leaned forward, holding on to the brass rail, to speak to a trolley girl who was standing on the small platform of a single-deck car, whereupon she was knocked into the roadway by a motor wagon. It was stated by the solicitor who represented the Corporation that there was no need for the guards to go on the rear platform. The women had been warned against swinging from one platform to another, and a notice had been posted warning them of the danger, in consequence of several minor accidents to women conductors.

At an inquiry into the death of a youth of 16 years who was employed as a conductor on the Pontypridd Urban Council Tramways, the evidence showed that deceased was on the front platform of a car proceeding towards Trehafod. He leaned out on the off side in order to look up at the trolley, and whilst doing so a car travelling in the opposite direction struck him in the back. He was picked up unconscious, and died soon after being taken to his home. Death was attributed to a fracture of the base of the skull. A verdict of "Accidental death" was returned, and Mr. J. E. Teasdale, the tramway manager, in expressing his sympathy with the relatives, stated that this was the only fatality to an employee since the inauguration of the car service eleven years ago.

MISCELLANEOUS NEWS AND NOTES.

Dundee Power Station.—The Electricity Committee of the Corporation has recommended that application be made for sanction to borrow £27,000 for the purpose of laying down additional plant, etc.

A Fine of 10*s*. was imposed at Sheffield on a man who was summoned for spitting in a tramcar. Managers should lose no opportunity of securing the punishment of persons guilty of this offence.

Lighting of Stopping Places.—Bolton Tramways Committee has declined to adopt a suggestion made by Horwich Council that the Corporation should provide and fix an electric light at each car stopping place.

High Receipts per Mile.—The receipts at South Shields continue to increase, and last week nearly 14,000 more passengers were carried than in the corresponding week of the previous year. The average receipts per car mile were 13.58*d*., as against 12.26*d*.

Free Conveyance has been granted by Aberdeen Tramways Committee to all soldiers wearing hospital uniform. As many of the patients are from England, the opportunity of taking a trip to the beach or a circular tour will be the more appreciated.

First Electric Railway in Argentina.—The Central Argentine Railway Company's Buenos Ayres and Tigre line has been converted to electrical working, and was opened for traffic in August. British contractors were responsible for the work of electrification.

Rolling Stock Required at Bombay.—In order to provide for the increased traffic the directors of the Bombay Tramways Company intend to place twenty additional two-car trains in service as soon at material can be obtained for their construction.

Withdrawal of Late Cars.—The postal and telegraph employees of Glasgow have protested against the proposal to restrict the running of the tramcars to 11 p.m. instead of midnight, in order to relieve the car crews of the strain entailed by the lighting regulations.

A New London Electric Railway.—From October 1 electric trains will run on the L. and N.W. and N.L. Railways between Broad Street, Kew Bridge and Broad Street and Richmond in lieu of the present steam trains. The services will be accelerated by about ten minutes.

Halfpenny Fare Abolition.—The Tramways Company has abolished the halfpenny fare from Dudley railway station to the market place. At a meeting of Leyton Ratepayers' Association a speaker praised the Council of that London suburban district for having withdrawn halfpenny fares.

Road Train for London Asylums.—The Metropolitan Asylums Board has purchased a road train, comprising steam tractor and three six-ton trailers, so that it can do its own haulage of coal, etc., from railways to asylums. Contract haulage prices have doubled since the war, and the road train will effect a great saving.

Runaway Car at Mansfield.—While a tramcar was on the incline at Stockwell Gate, Mansfield, on August 30, it ran backwards, and at the curve with the junction of Westgate it left the rails. The car then collided with two shops, doing considerable damage. Several passengers were injured.

American Railway Strike Notices Cancelled.—Following the rapid passage of the President's Eight Hours Bill through the U.S.A. Congress and Senate, the railwaymen's unions on September 2 withdrew the notices ordering a national strike on September 4. The differences between the companies and unions have yet to be adjusted. The legality of the Act is denied by certain companies, and a decision of the Supreme Court will be obtained.

Hawthorn (Victoria) Tramways Trust has lodged a Bill seeking authority to borrow £50,000 for extensions. The Government has informed the Trust that while the question of tramway control is under consideration sanction cannot be given to extensions, but money may be raised for the purchase of cars and equipment.

Coal Prices.—The President of the Board of Trade on September 5 received a deputation representing municipal gas undertakings and gas companies, who presented a request that the Government should take steps to prevent a further rise in the price of coal for home consumption. Mr. Runciman's reply was described as encouraging.

Women Cashiers for the L.G.O. Company.—In consequence of many of their cashiers having been called to the colours, the London General Omnibus Company is replacing them with educated women. Advertisements have recently appeared, asking such women, between the age of 25 and 35 years, to apply to the L.G.O.C. Training School, Milman's Street, Chelsea, S.W.

Trade Union Congress and Women Conductors.—The Trade Union Congress on September 7 accepted a resolution moved in the interests of the London and Provincial Union of Vehicle Workers, asking the Parliamentary Committee to assist them to obtain from the Home Secretary the revocation at the end of the war of the order licensing women to act as conductors on omnibuses and tramcars.

Need for Destination Indicators.—In calling attention to the declaration of a 7 per cent. dividend on the ordinary shares of Bombay Tramways Company, a local newspaper appeals to the management to do away with colour boards as a means of indicating the routes and to substitute a better arrangement. Glass windows are also asked for in place of curtains.

Wounded Soldiers' Free Rides.—Darwen Tramways Committee have decided to issue free passes to wounded soldiers in local hospitals, available between the hours of 10 a.m. and 12 noon, and 2 p.m. and 5 p.m. on weekdays, Saturday afternoon excepted. The passes are not available on Sundays. The manager is also empowered to grant similar passes to local disabled soldiers he considers entitled to privilege.

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Fine Weather Traffic.—The ideal weather that prevailed last Saturday at Glasgow brought a great traffic on the tramways in the afternoon and evening, but with rain on Sunday there was a drop of £200 as compared with the receipts of the previous Sunday. On the week's receipts there was an increase of nearly £3,000 compared with the preceding week, and £1,000 more than for the corresponding period of 1915.

Railwaymen's Demands.—Arrangements have been made for a meeting next week between the railway executive and representatives of the National Union of Railwaymen to discuss the men's demands for an advance of 10s. a week in wages. It is stated that in all probability the companies will ask the Government, as the chief authority in connection with the control of the railways, to accept responsibility for any advance in the scale of pay.

Arcing of Trolley Wires.—A South Shields resident has asked the magistrates if something could not be done to stop the flashes from the overhead trolleys. He also alleged that when the trolleys were removed at a certain terminus the flashes were nothing more nor less than signalling. The cars also ran without blinds. The clerk advised applicant to keep a record of the dates when flashes were seen and get witnesses, and he could then lay an information against the "responsible officials."

Dumb Conductors.—Passengers using the London County Council tramcars complain of the difficulty of ascertaining the destination of the cars now that indicator lights are often extinguished. To many persons the route numbers convey no meaning. The trouble would be avoided if the conductors discharged their duty of calling out at the stopping places. In this omission the women are the chief offenders. The inspectors who have recently been put on night duty might have their attention drawn to this neglect.

Aberdeen Tramways Company's Omnibuses.—In his remarks at the half-yearly meeting of Aberdeen Suburban Tramways Company, the chairman stated that a sum of £127 has been written off the value of the motor omnibuses for the half-year. Although these vehicles were not earning so much as he would like to see them do, and as they would do in normal times, he was satisfied that the directors acted wisely in introducing them. They would form great feeders to the system, and at present were of great utility.

Offences Against By-Laws.—At Hamilton, the Lanarkshire Tramways Company charged a woman with having contravened the company's by-laws by leaving a car while in motion. She pleaded guilty. Mr. J. C. Pollok, who appeared for the company, explained that not only was the car in motion but the woman had stepped off the wrong way, and she now turned round and blamed the conductor for throwing her off the car. The Court imposed a fine of 10s. A Birkenhead motor driver was fined 30s., or sixteen days' imprisonment for obstructing the progress of a tramcar for 1,560 yards.

The Demand for American Steel.—The New York correspondent of the "Yorkshire Post" reported on September 5 that steel mills have concluded such extensive contracts that many are sold out to the limit of their capacity almost to the end of 1917. The American Locomotive Company, the Baldwin Locomotive Works, and the American Car and Foundry Company together have closed contracts for over 200,000 tons. There is a big demand by home and foreign shipbuilders for plates. Inquiries for pig iron are again more numerous, and heavy buying is taking place, both export and home demands being extensive.

Chars-a-Bancs Pleasure Traffic Forbidden.—In compliance with the order of the Government forbidding the use of motor chars-a-bancs for pleasure traffic, the police at Chester on September 1 refused to allow an Oldham party of a hundred persons to continue a pleasure tour in three of these vehicles. The passengers returned by train while the chars-a-bancs made the return journey empty. In the counties adjoining Cheshire the police agreed not to insist on the regulations for the week-end, so that the owners of the vehicles might fulfil their contracts, but passengers were turned back on all sides on arriving at the Cheshire border, and were unable to proceed through the county into Derbyshire. In Manchester one owner has surmounted the difficulty by fitting a chars-a-banc body on to a rubber-tired steam lorry, which is permitted to run at twelve miles per hour.

The Institution of Automobile Engineers.—The first meeting of the session of the Institution of Automobile Engineers will be held on Wednesday, October 11, 1916, in the Hall of the Royal Society of Arts, John Street, Adelphi, W.C., at 8 p.m., when the President, Mr. L. A. Legros, M.Inst.C.E., will deliver his presidential address. The address will contain, among other things, a valuable collection of data in reference to torque curves of internal combustion engines. Cards of invitation to the meeting may be obtained on application to the Secretary of the Institution, 28, Victoria Street, Westminster, S.W. It is hoped that this year it will be possible to arrange for the full number of meetings, but meantime the Institution is engaged on much important work in connection with research and standardisation, the results of which should be available for the members before the end of the session.

Setts Dropping an Inch in a Night.—Wigan coroner held an inquiry on September 4 into the deaths of a woman and a child who were killed by a steam wagon running on to the footpath at Ince. The driver said that in consequence of the tramrail being from ½ in. to 1 in. above the paving it caused the rear wheel of the trailer to swerve to the right and the engine to the left, diverting it on to the footpath. He had felt the wheels "pluck at the rails" previously at that place. Mr. A. T. Gooseman, borough engineer, stated that the highest part of the rail was ⅞ in. above the setts, and that only six weeks ago the pavement was repaired. In a mining district such as that and on a road where there was much heavy motor traffic it was impossible to keep the track in better repair, and the setts would drop fully 1 in. in one night. The coroner pointed out that in a district like that it was impossible to maintain a tramway track and pavement in thorough condition. The jury returned a verdict of accidental death.

Improvements at Barrow.—Acceleration of the local tramways services has been witnessed since the recent completion of the doubling of the track in Abbey Road. The work was carried out under the direction of Mr. A. P. Fitzmaurice, of the British Electric Traction Company, by Messrs. Griffiths & Co., of London, the contractors who laid the original lines in Barrow, but owing to the scarcity of labour the task occupied nine months instead of three. The old rails have been Thermit welded. In order to provide for the increased traffic since the outbreak of war Mr. W. F. Bladon, the local manager, has secured two cars from another company, and he hopes to put two trailers into service. Plans have been prepared for an enlargement of the depot. Since the opening of the tramways in 1904 the number of cars has increased from a dozen to twenty-six. There are few towns where the service is carried on with so much difficulty. The lines pass over two lifting bridges, and on the route there are seven level crossings.

Track Repairs.—Attention was directed at the last meeting of Preston Council to the Tramway Committee's proposed postponement of the consideration of the Streets and Building Committee's resolution regarding the paving of the tramway tracks. Councillor Drury observed that if one gang could do the work now being carried out by two it was proper to make an alteration. Alderman Crompton, ex-chairman of the Tramways Committee, explained the arrangement entered into some years ago between the two committees for the carrying out of the track repairs. Alderman Margerison said the grinding, laying, and welding of rails meant that there would have to be a composite gang. Such a gang would have to be constituted by the experts in connection with both committees. Councillor Matthew explained that it was never the intention of the Streets and Buildings Committee that the work of the tramways engineer should be taken over by them. It was contended that work other than the laying of the rails could be done more economically by one body of men. It was reasonable that they should ascertain what was being done in other towns, and he asked that the minutes should be allowed to stand. The Tramways Committee's report was adopted.

Mexico Tramways Group.—Under the presidency of Mr. W. E. Rundle, the trustee for the bondholders, a joint meeting was held in London of the holders of the bonds issued by the Mexico Tramways Company, and Mexican Light and Power Company, Limited, the Mexican Electric Light Company, Limited, and the Pachuca Light and Power Company. The Chairman said that from the time defaults were first made by the companies in payment of interest the trustee was impressed with the necessity of obtaining as soon as possible an independent report upon the properties. It was recognised that the default had been brought owing to conditions wholly beyond the control of the directors and the executives of the companies. As the result of a report made by Messrs. Phippen and Trowbridge, after investigations in Mexico, it was decided to advise the bondholders to avoid the appointment of further receivers and to arrange for the bondholders to have control of the companies. The meeting approved of resolutions for attaining those ends to be submitted to meetings of the bondholders early in October. It was mentioned that the reports of damage done to the tramways during the revolution had been much exaggerated. Among the recommendations made by Messrs. Phippen & Trowbridge was one entailing provision for the continuance of negotiations with the Mexican Government respecting the return of the tramways property.

PERSONAL.

Mr. T. R. Skinner has been appointed general assistant electrical engineer at Worksop.

Sir Charles Parsons has been nominated president of the British Association for 1917.

Mr. C. Ormrod, chief clerk, Bolton Corporation Tramways, has been appointed chief traffic assistant.

Sapper G. B. Duncan, formerly a Dundee motorman, has been killed in France as the result of a shell bursting in a trench.

Mr. J. M. Stephens, manager of the wiring supplies department of the British Thomson-Houston Co., has joined the Royal Flying Corps as second lieutenant, and will act as an assistant equipment officer.

Miss Jessie B. Hamilton, second daughter of Mr. J. B. Hamilton, commercial manager to Leeds Corporation, and Mrs. Hamilton, is to be married on September 15 to Lieutenant Somerville, of the Scottish Rifles.

Mr. F. C. Bingham, who recently read the paper on "Tickets: Their Origin, Use, and Development," at an efficiency meeting of the London Traffic Group, was formerly a member of the general superintendent's staff of the Midland Railway.

Mr. J. S. D. Moffet, who was to have begun his duties as general manager, Belfast Corporation Tramways, on September 1, has been granted an extension to October 1, in order to enable him to terminate his work with West Ham undertaking.

Mr. E. J. Fox is resigning the position of London manager of Messrs. Stewarts and Lloyds, Limited, in order to take up the position of general manager of the Station Iron Works Co., Limited, near Nottingham, with a seat on the board as managing director.

Conductor M. Smith, of the Dublin United Tramways Company, while passing Mount Bridge, heard a splash in the canal, and noticed a boy in the water. Leaving his car, he jumped in and brought the lad ashore. This is the second occasion on which he has saved life.

Sir Sassoon David was re-elected a director of the Bombay Tramways Company at the first annual meeting held in Bombay since the removal of the offices from London. Mr. A. H. Froom was also re-elected, and Mr. F. C. Rimington was given a seat on the board during the period he remains in India.

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Captain S. W. Carty, late of the electrical department of the Liverpool Corporation Tramways, has recently returned from the Soudan. He was in charge of the motor transport supply column of the force that operated against the Sultan of Darfur. He was promoted captain for his services and thanked by the Sirdar.

Mr. D. H. Davies, chief electrical assistant of the Stockton-on-Tees electricity undertaking, has been appointed electrical engineer and tramways manager to Heywood Corporation in succession of Mr. R. E. Leach, who has been appointed electrical engineer at Loughborough. Mr. Davies, who is 35 years of age, has been at Stockton five years, and he has also served at Darlington, Bury, and Manchester. The salary is £200 per annum, and there were fifty applications.

Mr. F. Hanks, an official of the London County Council Tramways, has passed away after 38 years' service. At the time that the tramways were taken over by the Council he was chief inspector to the North Metropolitan Tramways Company, and he was in the service of the county authority until his death on August 28.

Mr. J. R. Wheatley, who died on August 28 at Sheffield, was a former Lord Mayor of the city. For many years he was a member of the Tramways Committee, his work there beginning during the horse traction era. His intimate knowledge of horses resulted in the securing of a superior class of animal and improved feeding, thus greatly improving running times. Mr. Wheatley retired from the Council in 1913.

CONTRACTS AND ORDERS.

Hadfields, Ltd., have received a contract from Salford Tramways Committee for the supply of manganese steel crossings, required for renewing the tramway junction at Lower Broughton Road.

Shepherd's Parging Block Co., Ltd., of Rochdale, have received an order from the Borough Engineer of Rotherham for block parging to be fixed in connection with the new track work on the extension of the Rotherham Corporation Tramways.

Belfast Tramways Committee have decided to replace eight mechanical stokers in the electricity station by four of an improved pattern, thus greatly increasing the efficiency of the station. An order has been given to Messrs. Babcock & Wilcox for four chain grate stokers, at £1,870.

Manchester Tramways Committee has allotted the following contracts:—F. Smith and Co., Ltd., copper trolley wire; J. Waddington and Co., indigo blue serge; W. Lupton and Co., indigo blue pilot; N. Hope and Son, drivers', etc., timekeepers' and traffic inspectors' cloth caps; W. Walsh and Son, timekeepers' straw caps; C. Dillingham and Sons, drivers', guards' and point boys' straw caps; G. Cadwell and Co., women guards' straw hats; Briggs, Jones and Gibson, Ltd., making-up uniform clothing.

FINANCIAL REPORTS AND MEETINGS.

Kalgoorlie Electric Tramways Company.—The accounts for 1915 show that after charging £4,000 for depreciation, and £9,206 for debenture interest the adverse balance of £12,520 brought forward has increased to £18,520.

Aberdeen Suburban Tramways Company.—At the half-yearly meeting on August 31, Mr. J. Mearns (chairman) said that the net profit was £300 less than the corresponding period of the previous year. The revenue was slightly greater, but the expense in wages maintenance and in road repairs had gone up, and the materials they required were almost unprocurable and in consequence very high in price. The balance, amounting to £3,200, the directors proposed to apply as follows:—£1,200 to renewal and depreciation account, which would then stand at £16,700; a dividend at the rate of 5 per cent. for the past year on the paid-up capital; £1,562 directors' fees, £31: leaving to be carried forward £415. Since the inception of the company, the directors had, with the approval of the shareholders, set aside sums varying from £1,000 to £1,500 per annum in building up a reserve fund, which now stood at £16,700, or more than half the subscribed capital. After a reference to the omnibus service, as reported in another column, the chairman remarked that the establishment of the suburban tramways had been of great public benefit. Fully 90 per cent. of the persons travelling to and from the city on the company's cars came from the west to places beyond the boundaries of the city. No less a sum than £4,594 was last year paid by the company to the Corporation after deducting the sum of £1,992 allowed for traffic expenses and general charges. The system was a splendid feeder to the Corporation tramways, and would if ever amalgamated with that system, be a profitable purchase for the city. Mr. G. Watt seconded the motion for the adoption of the report, which was agreed to.

Bolckow, Vaughan & Company, Ltd., have informed their shareholders that the obligations of the company under the Finance Act 1916, and the Munitions of War Act, 1916, for excess profits duty and munitions levy as a controlled firm not having yet been determined, they do not feel justified at present in publishing the balance sheet. The directors are satisfied, however, that after the payment of debenture interest and the dividend on the preference shares, the profits available will be sufficient for the payment of a further dividend to the ordinary shareholders of 8 per cent., in addition to the interim dividend of 3 per cent., paid in March last. The usual report and balance sheet will be presented at the ordinary general meeting of the company to be called at a later date.

Wolverhampton Corporation Tramways.—The gross profit for the year ended March 31 last amounted to £26,853, which included £1,459 on the motor chars-a-banc account. Net profit was £6,496, of which £4,018 has been contributed in aid of rates, and £2,478 has been carried forward to meet cost of repair work in 1916-17. A summary of the results for the past three years is appended:—

	1915-16.	1914-15.	1913-14.
Capital expenditure ...	£294,040	£292,361	£287,569
Amount outstanding ...	£203,051	£209,497	£215,100
Traffic revenue	£58,531	£54,593	£56,414
Total revenue	£59,111	£55,323	£57,203
Working expenses ...	£33,156	£34,605	£33,126
War allowances	£1,602	£461	—
Gross balance	£24,803	£20,257	£24,077
Net profit	£6,496	£3,744	£5,553
Passengers carried ...	13,266,114	12,230,785	12,610,881
Fare per passenger ...	1·05d.	1·06d.	1·07d.
Car mileage	1,150,591	1,181,309	1,195,326
Units per car mile ...	1·50	1·45	1·54
Power cost per car mile	1·573d.	1·463d.	1·513d.
Traffic receipts per track mile	£2,660	£2,530	£2,625
Traffic receipts per car mile	12·145d	11·091d.	11·333d.
Expenses per car mile ...	*6·880d.	*7·030d.	6·651d.
Ratio of working expenses	56·6%	62·5%	57·9%
Total track mileage ...	22 miles	21½ miles	21½ miles*
Number of cars in stock	52	52	52

* Exclusive of War Service allowances to employees.

BUSINESS NOTES.

The Shrewsbury and Challiner Tire Company, Ltd., of Ardwick Green, Manchester, have recently opened offices at 7 and 8, Lincoln Chambers, Lincoln Place, Dublin, which will be under the control of their resident manager, Mr. F. C. Johnston J.P. The fitting of Shrewsbury and Challiner tires will remain in the hands of the following firms: Messrs. Sanderson and Sons, Dublin; Mr. Arthur Stringer, of Belfast; and Mr. W. F. Peare, of Waterford.

In view of the developing interest in Russian trade, the Russo-British Trade Exchange, Ltd., 16, Regent Street, London, has issued a prospectus containing particulars of the second edition of the "Directory of British Manufacturers for Russian Trade." The publication will be extensively circulated in Russia, and no foreign firm's announcement will be accepted. The Exchange has now opened a Russian reading room, where daily and trade papers can be consulted and technical information obtained.

Users of heavy motor vehicles in the north-east of Ireland will be interested to know that one of the leading firms of motor traders, Messrs. Spence and Johnstone, Ltd., of 26-30, Linenhall Street, Belfast, have been appointed Ulster agents for the well-known all-British solid rubber tires, the Spencer Moulton. Messrs. Spence and Johnstone have installed a hydraulic press, and are carrying a big stock of Spencer Moulton solid rubber tires in order that Ulster trade may be promptly and efficiently handled. It is of interest to the tramway and railway world to recall that Messrs. Spencer Moulton and Company, Ltd., made tires for railway companies several decades ago. The solid tire department head office is at 230, Deansgate, Manchester.

CORRUGATION RECORDER.

A handy little instrument for measuring and registering the depth of corrugations on tramway and railway rails has recently been designed for use by traction engineers where it is desired to take permanent records. The instrument, which weighs about 4 or 5 lbs., is fitted with electro magnets for anchoring to the rail whilst taking records. Paper is run from one spool on to another spool at opposite end, and a recording pencil adjusted by a spring and attached to a slide, travels along the tread of the rails and records the irregularities on surface and at joints and registers them on the strip of paper, which can then be removed and kept for reference. These recorders can be obtained from Woods Gilbert Rail Placer Company, Ltd., of 2, Norfolk Street, London, W.C.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-four of the principal tramway undertakings in the United Kingdom for the week ended August 26 give total receipts of £108,508, or £10,303 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or sixty-nine more than for the corresponding week. The receipts this year were at the rate of £80 1s. 1d per mile of single track, and last year at the rate of £84 6s. 3d., thus showing an increase for the week of £4 14s. 10d. per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27, 1914	Cash. Sep. 7.	A Week Ago.
5%	5%	Alabama Traction. 5% 1st. Mt.	—	67	66xd	66
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4¾	7¼	73/9
4%	4%	Do. 4% Deb. ...	100	91	74½	74½
4½%	4½%	Do. 4½% Deb. ...	100	98½	76½	75½
5%	5%	Do. 5% Deb. ...	100	96	74½	74½
1/-	7d.	Auckland Elec. Trams. Ord. ...	1	1⅝	21/3	20/6
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	93⅜	93⅜
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11½	10⅜	10⅜
4½%	4½%	Do. 4½% Deb....	100	96	83	83
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	92	92
$¼	$1	Brazilian Trac. & Power Ord....	$100	66	61⅜	62
$1¼	$1¼	Do. 6% Cum. Pref.	$100	97	93	92
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	7	6¾
2/6	2/6	Do. 5% Cum. Pref.	5	5	85/-	85/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101¼	92	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	51	50½
6%	5%	Do. Pref. Ord....	100	106	54	48
5%	5%	Do. 5% Cum. Pref.	100	103	71	71
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	88½	80½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	65½	67½
—	£3	Brit. Elec. Trac. Ord.	100	—	36	36
—	6%*	Do. 6% Cum. Part Pref. ...	100	—	80	80½
5%	5%	Do. 5% Deb.	100	92	86	86½
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	70	70
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	92½xd	92½xd
3/-	6/6	Calcutta Tramways, Ord. ...	5	7½	6¾	6¾
1/3	1/3	City of B.A. Trams.	5	5⅜	90/7½	90/7½
5/-	4/-	Dublin United Trys 6% Pref.	10	12	10⅛	10⅛
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅞	2/1½	2/1½
6/-	6/6	Lanarkshire Trys. Co.	10	10½	9⅜	9⅜
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9½d.	9½d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	1⅜	2/3	2/2
6d.	6d.	Do. 5% Pref.	1	⅛	8/1½	8/-
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	62½	62½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88½	88½
5%	5%	Do. 5% Inc. Deb.	100	88½	81	79½
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	47½	47½
3/-	3/-	Madras Elec. 6% Pref. ...	5	5⅛	96/6	96/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	66½	66½
$1¼	$1¼	Manila Elec. R. R. & Light ...	$100	102	69½	69½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	78	78
$1¼	$1¼	Mexico Trams. Common ...	$100	70	29½	29½
5%	5%	Do. 1 Mt. 5% G.B.	—	84	43½	41½
6%	6%	Do. 6% Mt. Bds.	100	76	35½	35½
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	96½	96½
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95½	96
1/2*	1/2*	National Steam Car	1	½	19/9½	18/9
9½d.*	9½d.*	New General Traction	1	⅜	7/6½	7/9
6d.	8d.	Northern Gen. Trans. Ord. ...	1	⅜	15/4½	15/4½
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	66/-	66/-
5%	5%	Do. 5% 1st Deb.	100	80½	73½	73½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80½	80½
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	⅛	11/	11/-
10d.	8d.	Provincial Trams. Ord.	1	⅜	16/6	16/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84	84
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	92	91½
		1st. Mt. 5% 50 yr. ...	100	89½	81½	82½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	91½	91½
5%	5%	Do. 5% Perp. Deb.	100	99½	81½xd	82½xd
—	—	Singapore Elec. Trams	5/-	¼	4/10½	4/10½
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	99½	96½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	82½	82½
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	94½xd	94½xd
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	78½	78½
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	9/3	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4¼	90/-	90/-
—	—	Metropolitan Dist. Ord.	100	21½	18½	18
—	—	Undgd. Elec. Rys. of London ...	10	2½	38/9	39/-
		Do. "A"	1/-	⅜	6/-	6/-
4½	4½	Do. 4½% Bds of 1933 Rd.	—	99	101½	101½
6	6	Do. 6% 1st Cum. In. Db.	100	114	105½xd	108
6	6	Do. 6% In. Bonds Rd. ...	—	88	89½	92½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1915	1916	Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	Sep. 2	£49,780	£47,933	36	£1,771,989 —	£11,483
Auckland.....(28 days)	July 28	20,408	21,507	4	21,507 —	646
Ballarat and Bendigo ...	July 16	2,677	2,704	16	13,079 +	905
Brazilian Traction Mlrs.	July	6,703,000	7,195,000	31	47,145,000 +	2,757,890
Brisbane	July	31,150	32,880	31	227,230 +	17,580
British Columbia.....$	July	510,723	538,293	5	538,293 +	27,570
Buenos Aires Lacroze ...	Aug.	41,468	36,431	9	74,870 —	8,058
Burmah Tramway ... Rs.	July 29	3,726	3,437	52	... +	3,920
Calcutta.....Rs.	Sep. 2	63,571	66,822	36	2,363,142 +	104,849
Cape Town	July	...	13,357	...	...	...
Carthagena & Herrerias..	Aug.	1,523	2,081	35	20,821 +	6,493
Cordoba	July	14,375	14,263	18	57,313 +	776
East India	Aug.	2,266	2,522	4	2,522 +	256
Hong Kong .....$	July 29	11,938	17,172	33	420,128 +	95,286
Kalgoorlie	May	3,269	2,921	21	12,437 —	1,035
La Plata	Aug.	4,164	3,792	35	33,627 —	357
Lima	Apr.	31,623	33,556	18	134,629 +	5,614
Lisbon .....Escu.	July	...	206,280	...	...	...
Madras .....(2 weeks)	Aug. 15	30,869	32,269	33	439,380 +	33,100
Manila	July	23,750	33,700	31	887,739 +	39,986
Manaos .....Rs.	May	...	152,854	...	...	...
Melbourne	May	...	69,275	...	...	...
Montevideo	July	25,161	25,220	39	266,288 +	14,435
Pernambuco	Sep. 3	2,900	3,149	35	104,711 —	3,979
Peruvian .....$	Aug.	819,039	895,900	9	1,731,330 +	187,453
Port Elizabeth	July	...	3,166	...	...	...
Rangoon	Aug.	4,510	4,253	35	37,191 —	1,693
Shanghai .....$	Aug. 2	26,833	28,692	...	...	...
Singapore .....$	July 29	11,387	11,713	30	371,374 +	40,155
Toronto.....$	July	773,013	867,789	31	6,202,988 +	619,912
Winnipeg	July	248,022	242,688	31	1,944,162 —	56,116

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	1916	Incr. or Dec.	Wks.	Aggregate. 1916	Incr. or Dec.
Aberdare U.D.C.	Aug. 29	£341	£412	+ 71	22	£8,547	+ £881
Aberdeen Corporation...	„ 30	1,927	1,983	+ 56	13	25,704	+ 753
Accrington Corp.....	„ 23	569	629	+ 60	21	12,378	+ 392
Ayr Corporation	Sep. 2	407	638	+ 231	16	8,847	+ 731
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.....	„ 3	1,419	1,617	+ 198	22½	34,566	+ 3,122
Birmingham Corp.	„ 2	14,877	16,789	+ 1,912	22	366,230	+ 59,571
Do. Motor Omnibuses	„ 2	852	1,001	+ 149	22	22,277	+ 2,966
Blackburn Corp.	Aug. 30	1,239	1,305	+ 66	22½	29,605	— 926
Blackpool & Fleetwood.	Sep 2	1,976	2,352	+ 376	35	31,306	+ 2,978
Blackpool Corp.	Aug. 17	4,006	6,394	+ 2,388	20	46,603	+ 8,484
Bolton Corporation.....	„ 22	2,860	3,038	+ 178	22	62,768	+ 3,882
Bournemouth Corp.....	„ 30	2,704	2,969	+ 265	22	53,376	+ 2,989
Bradford Corporation ...	Sep. 2	6,653	8,136	+ 1,483	22	156,381	+ 4,521
Brighton Corporation ...	„ 3	1,405	1,703	+ 298	22½	30,338	+ 2,792
Bristol	„ 1	10,365	11,224	+ 859	35	350,784	+ 14,081
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	„ 2	1,653	1,819	+ 166	23	39,590	+ 1,956
Burton-on-Trent Corp...	„ 3	295	301	+ 6	22	6,144	— 546
Bury Corporation.....	„ 3	1,403	1,491	+ 88	23½	33,260	+ 1,386
Cardiff Corporation.....	Aug. 26	3,005	3,365	+ 360	21	64,333	+ 4,882
Chatham & District.....	„ 31	1,301	1,486	+ 185	35	42,596	+ 1,833
Chesterfield Corp.	„ 24	294	305	+ 11	21	6,054	+ 226
Colne Corporation	Sep. 2	275	293	+ 18	...	...	...
Cork Electric	Aug. 31	555	557	+ 2	35	17,735	+ 145
Croydon Corporation ...	*	...	...	...	...	...	...
Derby Corporation	Sep. 2	1,051	1,211	+ 160	22½	25,897	+ 1,656
Dover Corporation	*	...	...	...	...	...	...
Dublin & Lucan	„ 1	183	191	+ 8	9	1,777	+ 204
Dublin United	„ 1	6,257	6,831	+ 574	35	209,685	— 3,318
Dundee City	Aug. 26	1,410	1,457	+ 47	15½	21,847	+ 608
East Ham Corporation	Sep. 2	1,340	1,325	— 14	22½	29,874	+ 50
Exeter Corporation.....	„ 1	424	478	+ 54	22	9,085	+ 111
Glasgow Corporation	„ 2	22,530	23,552	+ 1,022	13½	313,245	+ 24,585
Glasgow Subway.....	„ 2	1,025	1,050	+ 25	35	39,982	+ 3,777
Glossop (U. Elec. Supp.)	„ 2	123	152	— 29	36	4,945	+ 509
Halifax Corporation.....	Aug. 29	2,383	2,702	+ 319	21½	51,453	+ 888
Do. Motor Omnibuses	„ 29	55	52	— 3	21½	1,098	— 58
Hastings & District.....	Sep. 1	1,375	1,646	+ 271	35	36,432	+ 2,043
Huddersfield Corp.	„ 2	2,734	3,015	+ 281	22	66,820	+ 6,068
Hull Corporation	„ 2	3,016	3,168	+ 152	22	70,028	+ 1,159
Ilford U.D.C.	„ 2	663	680	+ 17	22	15,788	+ 783
Ilkeston Corporation ...	„ 6	144	152	+ 8	23	3,285	+ 166
Ipswich Corporation	„ 2	594	601	+ 7	22	12,477	— 425
Isle of Thanet	„ 1	756	797	+ 41	48	17,453	— 2,901
Kilmarnock Corp.	„ 2	172	184	+ 12	15½	2,824	— 3
Lanarkshire	Aug. 31	2,150	2,442	+ 292	35	80,041	+ 12,467
Lancashire United	„ 30	1,857	2,014	+ 157	35	62,786	+ 1,508
Leeds City.....	Sep. 2	9,101	10,534	+ 1,433	23	222,774	+ 19,923
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	„ 2	785	933	+ 148	15½	14,306	+ 1,736
Leyton U.D.C.....	Aug. 31	1,718	1,732	+ 14	22	37,999	+ 335
Liverpool Corporation...	Sep. 2	13,913	14,964	+ 1,051	35½	493,416	+ 24,965
Llandudno & Colwyn B.	Aug. 25	678	883	+ 205	38½	13,308	+ 286
London County Council	July 19	46,999	48,584	+ 1,585	15½	755,622	+ 98,068
London Genl. Omnibus	*	...	...	...	...	...	...
London United.....	*	...	...	...	...	...	...
Lowestoft Corporation...	*	...	...	...	...	...	...
Maidstone Corporation..	Aug. 31	226	239	+ 13	22	4,035	— 139
Manchester Corp.....	Sep. 2	18,229	19,468	+ 1,239	22	425,210	+ 24,575
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	July 29	230	258	+ 28	17½	3,744	+ 280
N'castle-on-Tyne Corp.	Sep. 2	6,531	6,515	— 16	22	147,612	+ 4,633
Newport (Mon.) Corp....	„ 2	857	1,105	+ 247	22	21,265	+ 1,918
New St. Helens & Dist.	Aug. 30	1,131	1,132	+ 1	9	10,856	+ 442
Northampton Corp.....	„ 25	711	762	+ 51	21	15,107	+ 1,363
Nottingham Corp.....	„ 31	3,795	4,191	+ 396	22	86,456	+ 1,981
Oldham Corporation ...	„ 27	2,510	2,788	+ 278	22	56,768	+ 3,658
Portsmouth Corp.....	„ 19	3,087	3,422	+ 335	...	...	...
Preston Corporation.....	„ 30	1,035	1,187	+ 152	21½	24,108	+ 2,606
Provincial	Sep. 2	2,508	2,885	+ 377	48	110,492	+ 6,152
Reading Corporation.....	Aug. 31	827	957	+ 130	21½	18,863	+ 921
Rhondda Tramways.....	„ 24	1,235	1,452	+ 217	34	42,823	+ 3,336
Rochdale Corporation...	Sep. 2	1,808	1,980	— 172	22½	41,563	+ 1,651
Rotherham Corp.....	„ 6	1,193	1,678	+ 485	22½	34,931	+ 8,454
Salford Corporation.....	„ 4	5,423	5,489	+ 66	21½	120,155	+ 7,050
Sheffield Corporation....	„ 5	9,164	10,702	+ 1,538	23½	243,674	+ 39,549
Southampton Corp.....	Aug. 30	1,701	1,828	+ 126	21½	36,708	+ 2,913
Southend-on-Sea Corp...	„ 30	1,136	1,474	+ 338	22	23,100	+ 2,221
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.....	Sep. 2	844	971	+ 127	22½	19,902	+ 757
Sunderland Corp.....	„ 3	1,539	1,732	+ 193	22	37,108	+ 2,421
Sunderland District...	Aug. 30	609	685	+ 76	43	26,677	+ 1,665
Swindon Corporation	„ 23	222	242	+ 20	20½	4,276	+ 44
Torquay Tramways.....	„ 31	890	958	+ 68	35	20,579	+ 1,148
Tyneside Trys. & Tmrds.	„ 30	652	709	+ 57	9	6,513	+ 462
Wallasey Corporation ...	Sep. 2	1,446	1,627	+ 181	22½	32,624	+ 1,765
Walsall Corporation.....	„ 2	766	876	+ 110	36	28,899	+ 2,965
Walthamstow U.D.C....	„ 2	912	1,091	+ 179	22	25,465	+ 3,506
Warrington Corp.....	Aug. 31	463	520	+ 57	22	10,825	+ 825
West Ham Corporation	„ 31	3,184	3,152	— 32	21½	72,275	+ 2,158
Wigan Corporation	„ 31	1,555	1,687	+ 132	22	37,015	+ 3,084
Wolverhampton Corp....	*	...	...	...	...	...	...
Yorkshire (W. Riding)...	Sep. 3	1,657	1,898	+ 241	36	62,989	+ 5,736

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Defective rails—Composition of rails—Standard specification—Basic and acid Bessemer process—Sandberg process—Analysis of rails and rail tests—Drop test unnecessary.

CHAPTER XI.—CORROSION OF TRAMWAY RAILS.
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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

Founded 1892. LONDON, SEPTEMBER 14, 1916. VOL. XL.

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CHAPTER VIII.—JOINT WELDING.
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At joints—On new tracks—On steep gradients—On wheel tires—Contact of wheel and tire—Leeds special rail section—Railway rails—Depression of check.

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The construction of the tracks through such a country was one of the most difficult problems which

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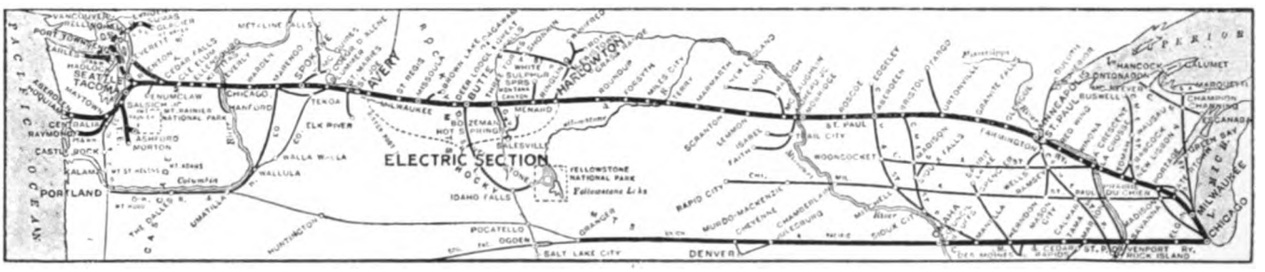
have ever confronted railway engineers. Out of this section, including many long grades and short radius curves, four steam engine divisions were selected for electrification, aggregating 440 miles in length. Steam engines were first abandoned on the Three Forks and Deer Lodge Division, 115 miles long, and crossing the main Continental Divide, thus giving the electrical equipment its initial trial under the severest conditions of the entire system. The first electric locomotives were placed in regular service on December 9, 1915, and during the month of April, 1916, service was extended to Harlowton, making a total of 220 miles of electrically operated road. By November 1, 1916, it is expected that steam engines will be superseded over the entire distance of 440 miles from Harlowton, Montana, to Avery, Idaho.

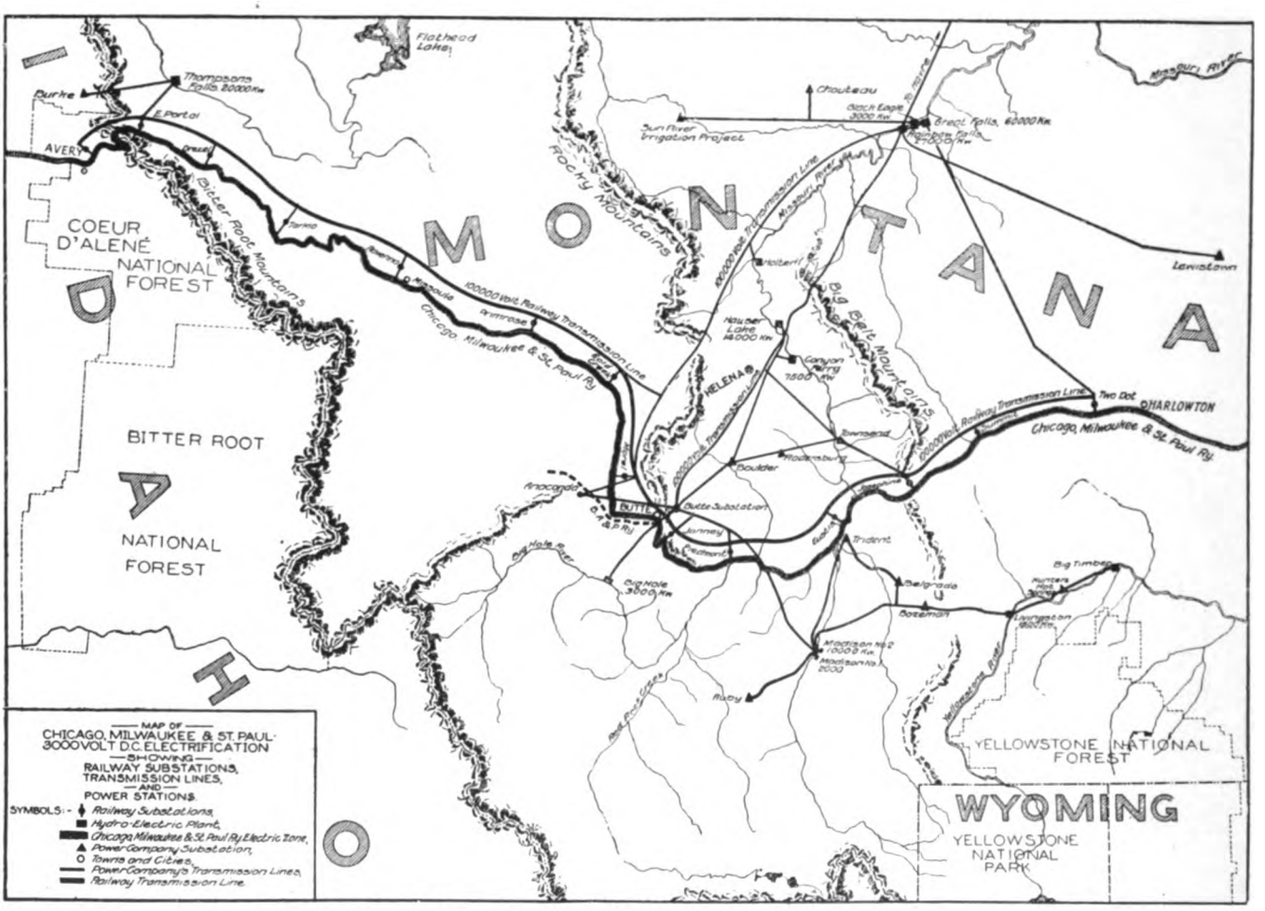
This project is the most extensive steam railway electrification in the world, the length of haul being nearly six times as great as any trunk line now operating with electric locomotives. The length of track between Harlowton, Montana, and Avery, Idaho, is approximately equal to that from New York to Buffalo, or from Boston to Washington, or in this country from London to Perth.

In crossing the three mountain ranges included in the electric zone, there are several grades of 1 per cent. or more, the most difficult of which is the 21-mile 2 per cent. grade between Piedmont and Donald, and the longest the 49-mile 1 per cent. grade on the west slope of the Belt Mountains. The curves are necessarily severe, the radius of the sharpest being 574 ft. There are 36 tunnels in the electric zone, of which the longest is the St. Paul Pass tunnel, a mile and a half long, through the ridge of the Bitter Root Mountains.

The order for the electrification of the line (which involves 650 miles of single track), including the supply of locomotives, was given to the General Electric Company, of Schenectady and New York, in September, 1914, and the original expectation was that the work would be completed by the beginning of 1918. So rapid has been the progress, however, that, as noted above, it is now anticipated that electric traction will be in use over the whole 440-mile stretch by November next.



Outline Map of Chicago, Milwaukee and St. Paul Railway, showing Situation of Electric Section.



Map of Electric Section, Harlowton to Avery, in Mountain District—Chicago, Milwaukee and St. Paul Railway.

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Relief Map of Electrified Mountain Section of Chicago, Milwaukee and St. Paul Railway.
[Showing Situation and Altitude and Main Power Station and Sub-stations.]

Electrical Operation.

The passenger service consists of two all-steel finely equipped transcontinental trains in each direction, the "Olympian" and "Columbian," and a local passenger train in each direction daily between Deer Lodge and Harlowton. Freight traffic through the electric zone comprises from four to six trains daily in each direction. Westbound, the tonnage is made up of manufactured products and merchandise for Pacific Coast points and foreign shipment. Eastbound tonnage includes grain, lumber, products of the mines and some live stock.

As a larger part of the traffic is through goods, trains are made up of an assortment of cars of various railroads, including box and flat cars, coal and ore hoppers, stock cars, refrigerators, etc., varying in weight from 11 to 25 tons empty and as high as 70 tons loaded, These cars being owned by many different railway systems are equipped with air brakes adjusted for different conditions of operation, and in accordance with different standards as to braking power and type of equipment, thus making the problem of holding the long trains on the heavy down grades by air brakes a most difficult one. It is here that the regenerative control is of so much value.

Electrification promises a material reduction in running time. It has been found, for example, that on the 21 mile 2 per cent. grade from Piedmont to Donald, the electric locomotive can reduce the running time of passenger trains from an hour and five minutes to approximately 40 minutes. On the run from Deer Lodge to Butte which, under the steam locomotive schedule, required an hour and 20 minutes, a saving of approximately 30 minutes can be made.

In the goods service it has been found that on the first division, where the steam locomotives required 10 to 12 hours to make 115 miles, electric locomotives can meet a schedule of from seven to eight hours for the same distance. The heavy grades and frequent curves at certain points offer serious obstacles to steam locomotive operation even in the summer time, but with winter temperatures and heavy snow falls in the Bitter Root Mountains, serious delays have occurred, owing to engine failures or to inability to make steam. The capabilities of the electric locomotives are in no way impaired by cold weather or by inability to obtain fuel or water in case of snow blockades. During a series of record-breaking temperatures in December, 1915, Mallet engines were frozen up at different points on the system and the new electric equipment was rapidly pressed into service to replace them. On several occasions electric locomotives hauled in disabled steam engines and trains which would otherwise have tied up the line.

During initial operation on the Rocky Mountain division, the capacity of the new locomotives has been thoroughly tested. Trains of 3,000-tons trailing have been hauled east and 2,800 tons west, using a helper on the heavy grades. From the operating data obtained on the first division, it is evident that much heavier trains can be hauled with the electric locomotives than with steam engines, and all passing tracks are being lengthened to take advantage of longer trains. On some of the runs where the grades are less than 1 per cent., trains of as many as 130 cars and as heavy as 4,000 tons have been hauled with a single locomotive.

The four through passenger trains, "Olympian" and "Columbian," are taken across the two mountain ranges by a single passenger locomotive. These trains at present consist of eight vestibuled steel coaches, weighing approximately 650 tons. Instead of changing locomotives at Three Forks, as has been the practice under steam operation, the same locomotive is run through the 220 miles from Deer Lodge to Harlowton,

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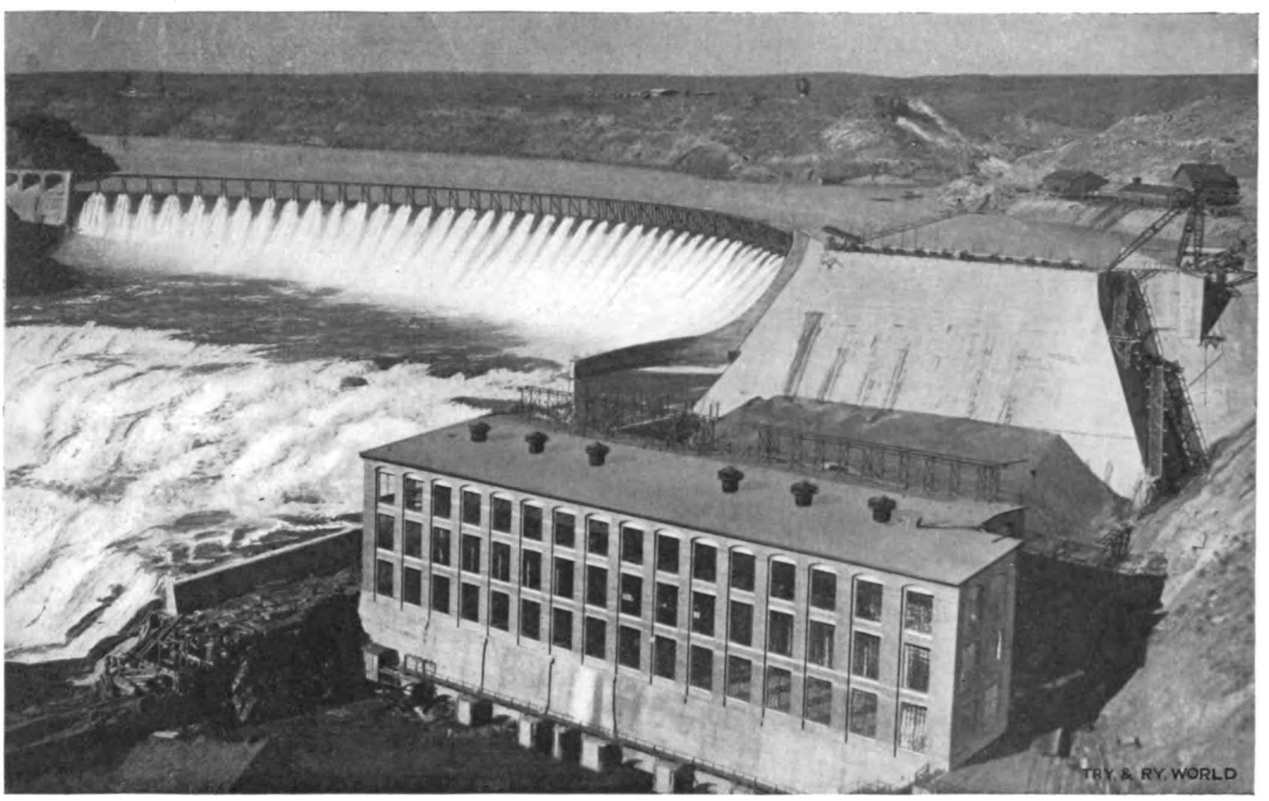
changing crews midway. Passenger trains will travel over the entire electrified division in approximately 15 hours, including all stops, and the tourist will thus have an opportunity of traversing by daylight some of the most beautiful scenic regions in the United States, and without suffering the annoyance of cinders and smoke incident to the use of steam locomotives. The local passenger train operating in the electric zone between Deer Lodge and Harlowton is drawn by a half unit weighing about 150 tons.

The Power Supply.

The most careful precautions were taken by the railway company in making plans for this electrification to insure a reliable source of power. The Montana Power Company, with whom a contract was arranged for the supply of electric power, has a network of transmission lines covering a large part of Montana, which are fed from a main station at Great Falls, and a number of other widely-separated water power-stations that have an adequate capacity at all seasons of the year. A notable feature of this pioneer electrification is therefore the conservation of fuel consequent upon the utilisation of water powers. The railway company pay to the power company only 1·3 farthings (·325d.) per kilowatt-hour of energy purchased. The economy is such that it is hoped that the saving as compared with steam locomotives will be sufficient to pay a handsome return on the cost of conversion, which is put at £2,400,000. In addition there will be the other economies associated with heavy electric traction, and there is the ability to haul much heavier trains than can be drawn by steam locomotives.

The Montana Power Company have such a series of generating stations, nearly all of them depending on water power—abundant among the mountains—that it is of interest to set out a list, giving the capacity of the apparatus installed at each station :—

Completed Hydro-Electric Plants.	Capacity. KW.
Great Falls, on Missouri River	60,000
Rainbow Falls, on Missouri River near Great Falls (completed in 1910)	27,000
Black Eagle Falls, on Missouri River near Great Falls (reconstructed in 1913)	3,000
Black Eagle Falls, hydraulic power, 8,000 h.p.	—
Hauser Lake, on Missouri River, north-east of Helena (completed in 1911)	18,000
Canyon Ferry, on Missouri River, north-east of Helena (completed in 1898 and enlarged in 1901)	7,500
Madison No. 1, on Madison River, 60 miles south-east of Butte (completed in 1901 and re-modelled in 1907)	2,000
Madison No. 2, on Madison River, 60 miles south-east of Butte (completed in 1906)	10,000
Big Hole, on Big Hole River, 22 miles south-west of Butte (completed in 1898)	3,000
Livingston, on Yellowstone River (completed in 1906 and enlarged in 1908)	1,500
Billings No. 1, on Yellowstone River (completed in 1907)	1,080
Lewistown, on Spring Creek (completed in 1906 and re-modelled in 1913)	450
Thompson Falls, on Clark's Fork of Columbia River	20,000
Total of present capacity of 12 stations	153,530



Hydro-Electric Power Station at Great Falls on the Missouri River.

Steam Plants.		
Butte (completed in 1907)	5,000	
Billings (completed in 1906)	560	
Conrad (completed in 1910)	110	
Phœnix, in Butte (completed in 1895)	250	
		5,920
Total		159,450

Hydro-Electric Powers in Course of Development and Definitely Projected.	Capacity KW.
Thompson Falls, on Clark's Fork of Columbia River*	10,000
Holter, on Missouri River near Helena (under construction, to be completed in 1917)	40,000
Total	50,000

* Additional units to be installed in 1917.

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HYDRO-ELECTRIC POWER SITES UNDEVELOPED.

Site " C " at Great Falls, on Missouri River, between Rainbow and Great Falls	28,500
Below Great Falls, on Missouri River	28,500
On Missouri River about 30 miles north-west of Missoula	13,500
Madison No. 3, on Madison River	18,500
Black Eagle Plant, reconstruction	10,000
Snake River Falls, on Henry's Fork of Snake River, 20 miles north of St. Anthony, Idaho	22,500
Total	121,500

SUMMARY.

Completed hydro-electric and steam plants	159,450
Hydro-electric powers in course of development ...	50,000
Hydro-electric power sites undeveloped	121,500
Total	330,950

SUMMARY OF TRANSMISSION LINES IN SERVICE, JANUARY 1, 1916.

Steel tower lines, 100,000 volts	305 miles
Steel tower lines, 50,000 volts	35 miles
Pole lines, pin type, 11,000 to 60,000 volts ...	635 miles
Pole lines, suspension insulator type, 50,000 to 100,000	312 miles
Bridge type, 100,000 volts	341 miles
Total	1,828 miles

current at 3,000 volts pressure. It is then distributed by catenary overhead construction from which it is collected by the locomotives. This is the highest working pressure for direct current yet used on commercial traction work.

Fourteen sub-stations are equipped for converting the 100,000-volt alternating-current to 3,000 volts direct-current. They are distributed along the route at average intervals of 32 miles. Each station contains step-down transformers, motor-generator sets, switchboard, and the necessary controlling and switching equipment. The transformers receive the line current at 100,000 volts, and supply the synchronous motors at 2,300 volts. Each synchronous motor drives two 1,500-volt, direct-current generators connected permanently in series, thus supplying 3,000-volt current for the locomotives. The fields of both the synchronous motors and the direct-current generators are separately excited by small direct-current generators direct-connected to each end of the motor-generator shafts.

The following table gives a list of the sub-stations, the distance of each from Harlowton, the number and size of the units, and the total capacity of each sub-station. It will be noted that the unusual interval of 32 miles is only rendered possible by the high pressure of 3,000 volts.

Four 10,000 kva. Water-wheel Driven Generators in Great Falls Power Station

The available capacity of the storage reservoirs in service is 447,150 acre feet, of which the largest, the Hebgen reservoir on Madison River, contributes 325,000 acre feet. There is a further undeveloped capacity of 78,500 acre feet.

The Montana Power Company's transmission lines, which are carried in some cases on steel towers and in others on wooden poles, tap into the railway system at seven different points where the power is most needed. The railway company's transmission line extends the entire length of the system on wood poles. In most cases this line is built on the company's right of way, although at several points there are cut-offs which make a considerable saving in the length of line. With this completely inter-connected transmission system, each sub-station may be fed from either direction, and also at the tie-in points from a third source of power.

The power is transmitted in the form of three-phase alternating current at 100,000 volts and 60 cycles per second, and is converted at the sub-stations to direct

LOCATION AND EQUIPMENT OF THE FOURTEEN SUB-STATIONS.

Sub-Station.	Miles from Harlowton.	No. and Size of Units in KW.	Capacity in KW.
Two Dot ...	12	2–2,000	4,000
Summit ...	45·6	2–2,000	4,000
Josephine ...	75·8	2–2,000	4,000
Eustis	105·8	2–2,000	4,000
Piedmont ...	148·5	3–1,500	4,500
Janney ...	175·9	3–1,500	4,500
Morel	209·3	2–2,000	4,000
Gold Creek ...	244·9	2–2,000	4,000
Ravenna ...	277·6	2–2,000	4,000
Primrose ...	315·4	2–2,000	4,000
Tarkio	352·0	2–2,000	4,000
Drexel	390·1	2–2,000	4,000
East Portal ...	413·9	3–2,000	6,000
Avery	437·6	3–1,500	4,500
		32	59,500

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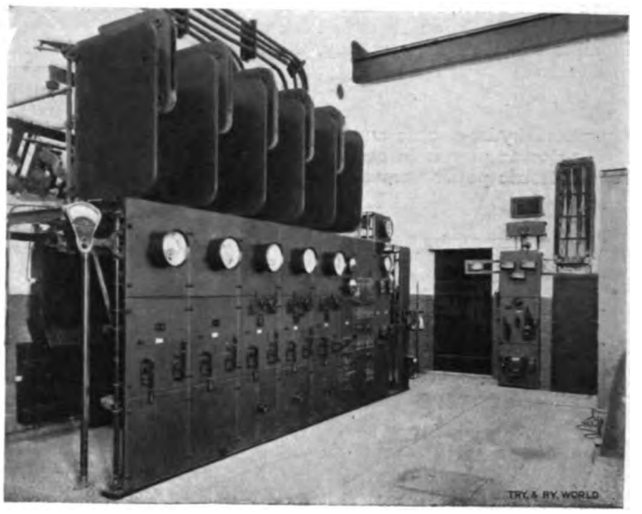
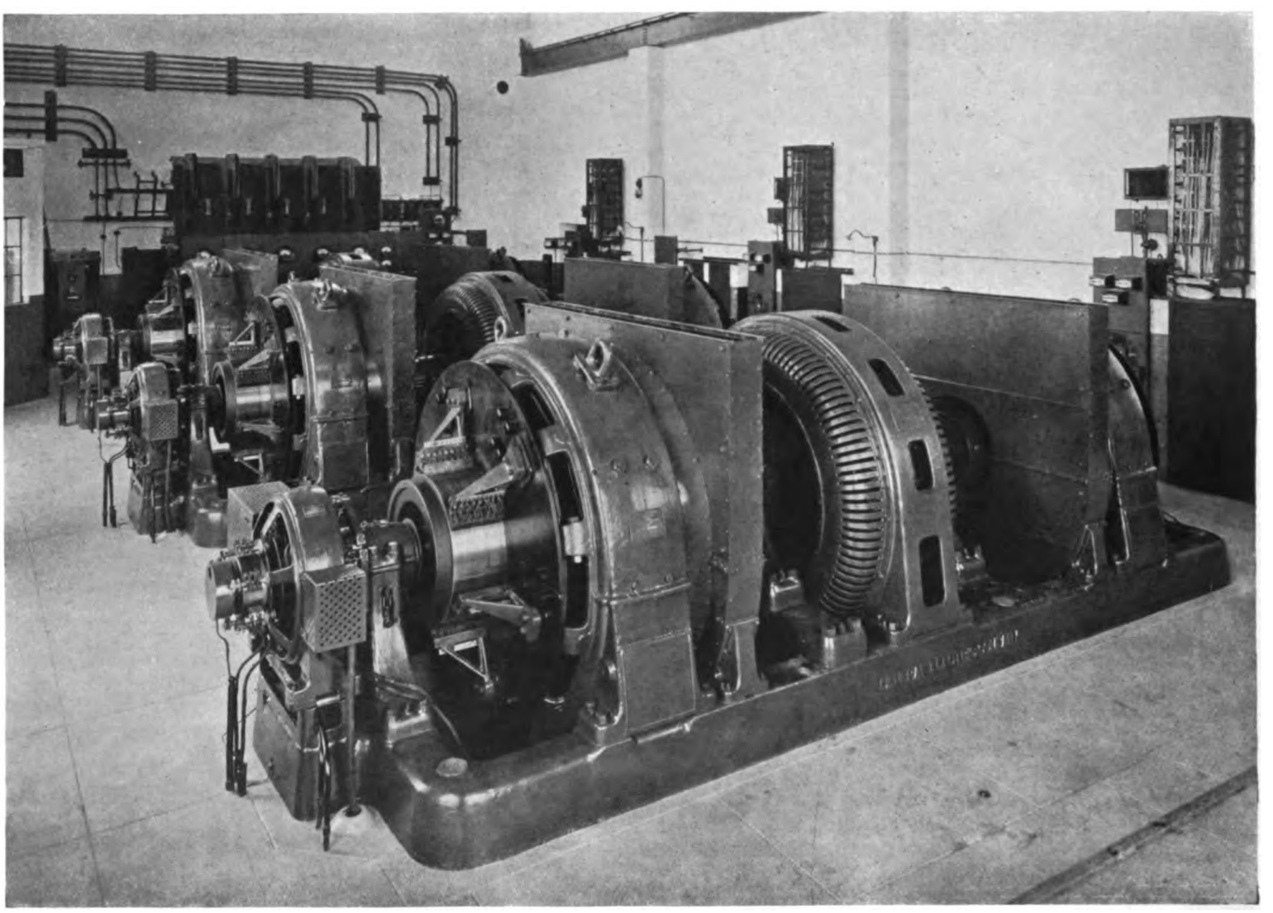
Each of the motor-generator sets consists of a 60-cycle, three-phase, 2,300-volt synchronous motor direct-connected to two 1,500-volt generators. The latter are connected permanently in series to supply direct current at 3,000 volts to the trolley wires. Each set is provided with an exciter at each end, one providing excitation for the revolving field of the motor, and the other supplying the separately excited fields of the d.-c. machines. Longitudinal ventilation of the core and field coils is provided, and this has effected a considerable reduction in the floor space required per kilowatt. The generators have commutating poles and compensated pole-face windings to ensure sparkless commutation under heavy overloads. This overload capacity is 150 per cent. for two hours, and 300 per cent. for five minutes. Thus the necessary margin is provided for starting a train of maximum tonnage on the most difficult gradients. As the scheme provides for power regeneration, the motor-generator sets are designed to operate inverted in case the regenerated power exceeds that required by other trains working near by. The excess energy is transmitted to the 100,000-volt system.

The main direct-current switchboard in each sub-station represents the latest practice in high-voltage direct-current switching apparatus. A panel is provided for each set, and two panels are provided for feeders in each direction. The circuit breakers and switches are mounted on separate panels, situated above and a short distance behind the main panels. The control handles for operating the breakers and switches are on the main panels, and are connected to the circuit-breaker panels through insulated wooden rods. Switchboards are also furnished for the synchronous motors and auxiliary circuits. Oil switches and other standard 100,000-volt equipment are installed for the high-tension circuits.

There are twenty-three 2,500-KVA., and nine 1,000-KVA. transformers in the various sub-stations. They are of the three-phase core type, with a ratio of voltages of 102,000 to 2,300. For regulating purposes taps are provided for 97,200 and 94,200 volts. Taps are also brought out on the secondary windings to give 1,150 volts for starting the motor-generator sets. The transformers are oil cooled, and the tanks are of the



Switchboard in Sub-station.



Motor Generators in Piedmont Sub-station.

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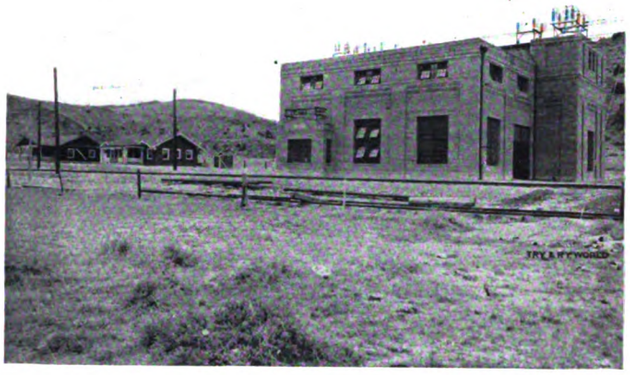
tubular type, the main body consisting of steel plate with tubes welded to the side of the tank at the top and bottom, giving absolutely oil-tight joints. An air dryer and breather is attached to the tank, so that



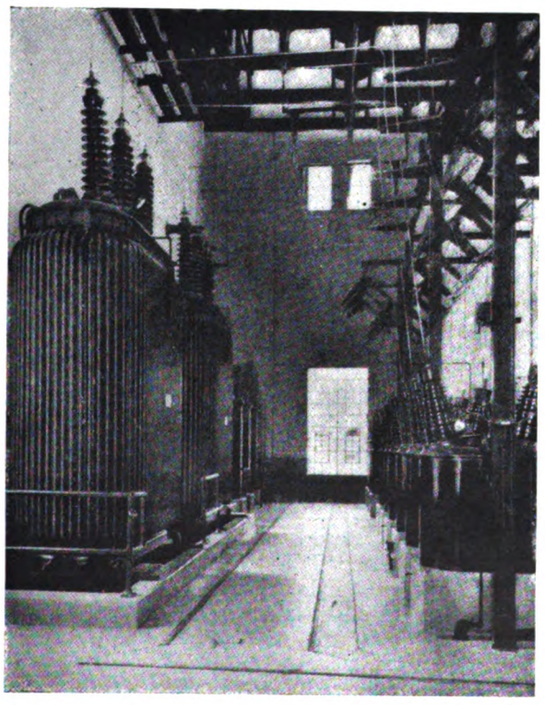
Eustis Sub-station and Bungalows of Operating Staff.

all interchange of air between the interior and the outside must take place through this channel. The dryer is provided with chambers containing a moisture-extracting medium, thereby preventing the entrance of moisture to the tank.

Each sub-station is also furnished with a 10-KW. three-phase transformer, stepping down from 2,300 to 110 volts for lighting and auxiliary power circuits. For operating the railway signal circuits a 25-KW. single-phase transformer is installed in each sub-station, stepping up from 2,300 to 4,400 volts.

The Overhead Construction.

The outgoing 3,000 volt current from the sub-stations is tapped into a feeder of 500,000 circular mils cross

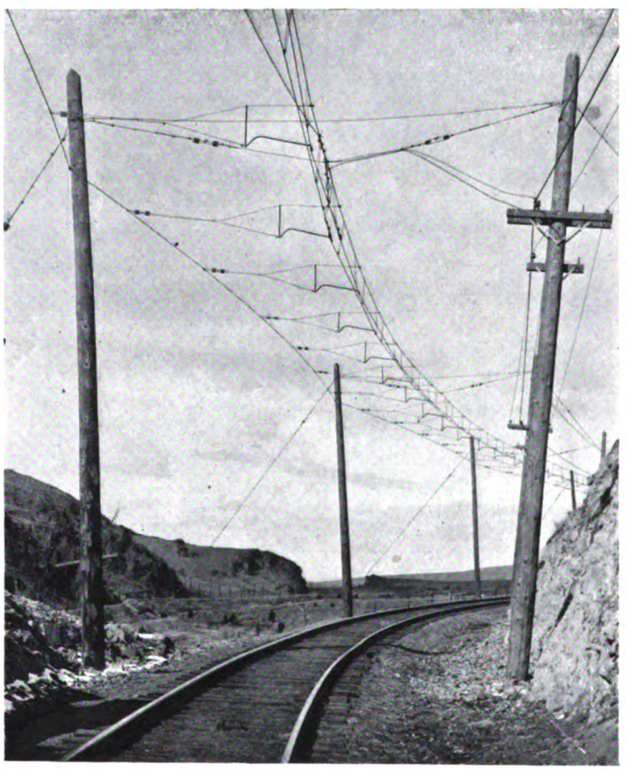


Transformer Room at Piedmont Sub-station.

section, which extends over the entire length of the electrification. On the heavy gradients there is a supplementary feeder. The main feeder is tapped to the trolley wire at every seventh pole, or approximately every 1,000 ft. On the top of the poles is carried a supplementary 4/0 negative feeder, which is tapped to the middle point of every second reactance bond. These bonds are used for insulating the 60-cycle signal circuits, and are installed at points from 5,000 to 6,000 ft. apart.

Except in yards, where the number of tracks to be spanned exceeds the possibilities of wood pole construction, and where accordingly steel supports are employed, wood poles are used throughout. Bracket construction is adopted wherever track alignment will permit, while on the sharper curves and in yards the cross-span method is used. As the result of investigation and experiment a novel flexible catenary system of wiring, designed by the General Electric Company and installed under the direction of the railway company's engineers, has been adopted. With this construction the current is collected both by high-speed passenger locomotives and by heavy freight locomotives without any sparking.

Instead of one wire, two trolley wires are employed. These twin 4/0 copper wires are flexibly suspended side by side from the same catenary by independent hangers alternately connected to each trolley wire. The hangers of one trolley wire are placed at points mid-span of the other. In the shunting yards only one



Overhead Construction on Curve.

trolley wire is used. The advantage of the double wire construction is due partly to the greater surface for the collection of current, but largely to the very great flexibility of the alternately suspended trolley wires.

In regard to the track work, each rail joint is bonded with a 250,000 circular mils bond, and double bonds are used on the heavier gradients.

The Locomotives.

The electric locomotives which have been provided are the most powerful traction machines, steam or electric, that have ever been built. They are constructed in two units permanently coupled together, the halves being duplicates and each capable of

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independent operation. Each half has eight driving wheels and a four-wheeled bogie at the end, so that the complete locomotive has 24 wheels.

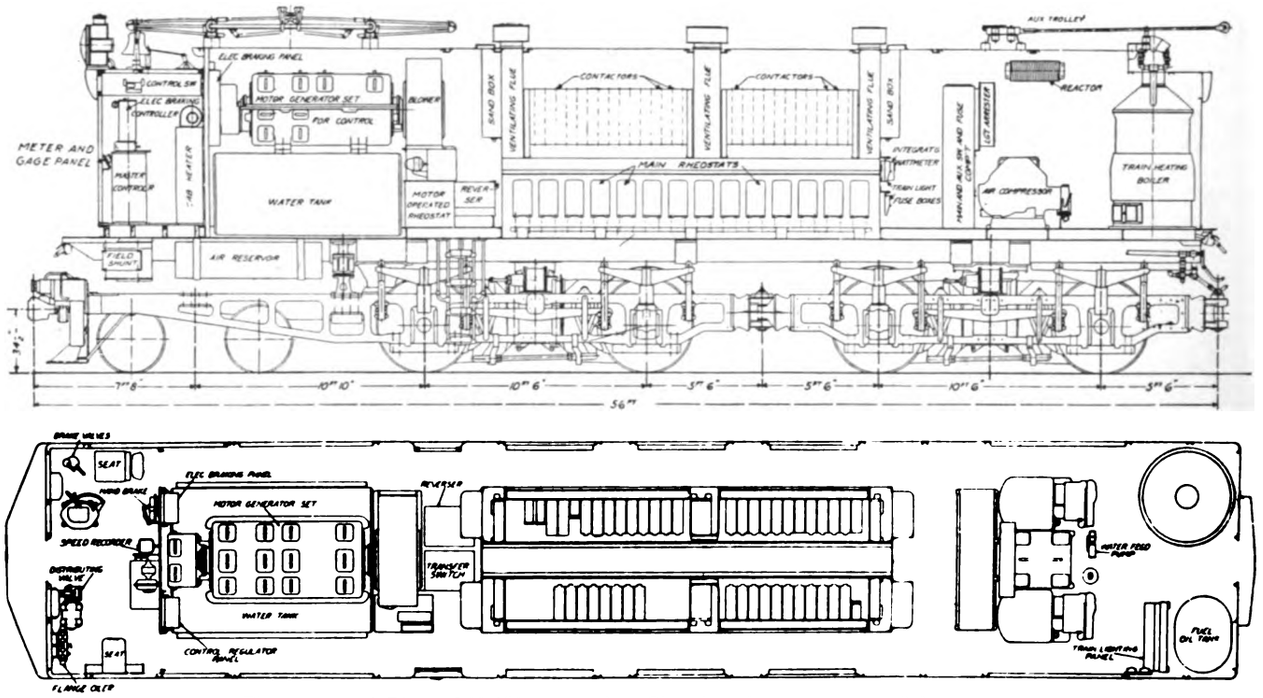
The following are the leading dimensions, weights, and other data :—

MAIN LINE FREIGHT LOCOMOTIVES.

Type of locomotive	3,000 volts d-c.
Length over all	112 ft.
Total wheel base	102 ft. 8 in.
Rigid wheel base	10 ft. 6 in.
Total weight	564,000 lb.
Weight on drivers	448,000 lb.
Weight per driving axle	56,000 lb.
Weight per guiding axle	29,000 lb.
Diameter of driving wheel	52 in.
Diameter of guiding wheel	36 in.
Number of driving motors	8
Total output (continuous rating)	3,000 H.P.
Total output (1 hour rating)	3,440 H.P.
Tractive effort (continuous rating)	71,000 lb.
Per cent. of weight on drivers (trac. coef.) ...	15·83
Speed at this tractive effort at 3,000 volts ...	15·75 m.p.h.
Tractive effort (1 hour rating)	85,000 lb.
Per cent. of weight upon drivers (trac. coef.) ...	19
Speed at this tractive effort at 3,000 volts ...	15·25 m.p.h.
Tractive effort available for starting (30% coef.)	136,000 lb.

service with direct current motors operating at a potential as high as 3,000 volts and the first to use direct current regeneration. The passenger locomotives are equipped with a gear ratio permitting the operation of 800-ton trailing trains at speeds of approximately 60 miles per hour on tangent level track. The average passenger train weighs from 650 to 700 tons and is hauled over the 2 per cent. grade without a helper. The freight locomotives are designed to haul a 2,500-ton trailing train at approximately 16 miles per hour on all grades up to and including 1 per cent. On 2 per cent. grades the trailing load was limited to 1,250 tons, although this figure has been exceeded in actual operation.

The cab consists of two similar sections extending practically the full length of the locomotive. Each section is 52 ft. long, and the cab roof is 14 ft. above rail level, exclusive of the housings for ventilation. The pantagraph collector bases are 5 ft. above the roof, owing to the unusual height of the trolley wire. The outer end of each cab contains a compartment for the driver, while the remainder is occupied by the electric control equipment, train heater, air brake apparatus, etc.



Elevation and Plan of Half-Locomotive, Showing Arrangement of Apparatus.

The passenger and freight locomotives are identical, with the exception of gear ratio and the addition of an oil-fired steam boiler in each half of the passenger locomotive for heating the coaches. The two boilers are capable of evaporating 4,000 pounds of water per hour, and this equipment, with tanks for oil and water, bring the weight of the locomotive up to approximately 300 tons (of 2,000 lb. each).

An interesting comparison to show the tractive effort of these enormous machines may be made by mentioning that the American wood-burning locomotive of 50 years ago weighed 20 tons and had a tractive effort of only 5,000 lb. The modern Mallet steam locomotive weighing 278 tons with tender, which has been displaced, has a tractive force of 76,200 lb., while the electric locomotive, weighing 282 tons (252 British tons), has a running tractive force of 85,000 lb. or a starting tractive force of 136,000 lb.

There are 42 of these main line locomotives (30 freight and 12 passenger) and two switching locomotives. The locomotives are the first to be used for railroad

Each locomotive is equipped with eight type GE-253-A, 1,500-volt motors, insulated for 3,000 volts to ground. This motor has a normal one hour rating of 430 H.P. and a continuous rating of 375 H.P., so that the locomotive power plant has a normal one hour rating of 3,440 H.P. and a continuous rating of 3,000 H.P. Each motor is twin geared to its driving axle in the same manner as on the Butte, Anaconda and Pacific, the Detroit River Tunnel, and the Baltimore and Ohio locomotives, a pinion being mounted on each end of the armature shaft. Additional flexibility is obtained by the use of a spring gear and a spring nose suspension, which minimise the effect of all shocks and also reduce gear wear to a minimum. The motor is of the commutating-pole type and is constructed with longitudinal ventilating ducts in the armature for forced ventilation from a blower in the cab.

The control equipment is the Sprague General Electric type **M** arranged for multiple unit operation. The main control switches are mounted in steel compartments inside the locomotive cab, with convenient aisles for

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inspection and repairs. A motor-generator set in each half of the locomotive furnishes low-voltage current for the control circuits, headlights, cab lighting, and for charging the storage batteries on the passenger coaches. Under steam operation, the charging current for these batteries is furnished by a turbo-generator unit on the locomotive. The blower for ventilating the traction motors is also direct connected to one end of this set.

The pantagraph collectors, one of which is mounted on each half of the locomotive, are of the double-pan type with a working range of from 17 ft. to 25 ft. above the rail. The contact elements are of the same metal as the trolley wire, so that current passes from copper to copper. The air brake equipment is practically the same as that used on steam locomotives, except that motor-driven air compressors are used to furnish compressed air. Aside from the air brakes, compressed air is also used for signals, whistles, bell-ringers, sanders, flange oilers, pantagraph trolleys, part of the control equipment, and on the passenger locomotives for the oil-fired steam boilers.

Front View of Locomotive showing Pantograph Collector Extended.
(A Goods Train Photographed at Donald, the Summit of the "Continental Divide.")

Shunting Locomotives.

The shunting locomotives, which are used in the yards, are of the swivel truck type, weigh 70 tons each, and are equipped with four geared motors. A single pantagraph of construction similar to that used on the main line locomotives is mounted on the cab and in other ways the locomotives represent the standard construction commonly used with the steeple cab type of shunter. The motors (known as type GE-255) are of box frame, commutating-pole, single-geared type designed for 1,500 volts with an insulation of 3,000 volts to the ground. Many of the shunting locomotive parts are interchangeable with those used on the main line locomotives; for example, the air compressors, small switches, headlights and cab heaters.

The following are details relating to the shunting locomotives :—

Shunting Locomotives.

Length inside knuckles	40 ft.
Height over cab	13 ft. 10 in.
Height—trolley down	16 ft. 8 in.
Width overall	10 ft.
Total wheel base	29 ft. 4 in.
Rigid wheel base	8 ft.
Diameter of wheels	40 in.
Weight of locomotive complete	140,000 lb.
Weight per driving axle	35,000 lb.
One hour rating of locomotive	542 H.P.
Tractive effort at one hour rating	18,400 lb.
Speed at this rating	12 m.p.h.
Continuous tractive effort	13,480 lb.
Speed at continuous rating	13·2 m.p.h.
Tractive effort (30 per cent.)	42,000 lb.

Regeneration.

In past years regenerative control for tramcars on gradients has been tried in this country, but the use of the method has not spread. On such a railway as the one now under discussion, and with such heavy trains, the problem of braking and the advantages of regeneration assume new and supremely important features. The way in which those responsible for this railway and its equipment look at the matter is this. Regeneration, or the recovery of energy on the descending grades, by reversing the function of the electric motors reduces the cost of operation and furnishes a ready solution of the difficult braking problem. On the long continuous grades encountered in crossing the three mountain ranges, great skill is required to handle either the heavy and varied freight or the high speed passenger trains with the usual air brakes. The entire energy of the descending train must be dissipated by the friction of the brake shoes on the wheels, and it approximates 3,500 K.W. or 4,700 H.P. for a 2,500-ton train running at 17 miles per hour on a 2 per cent. grade, thus

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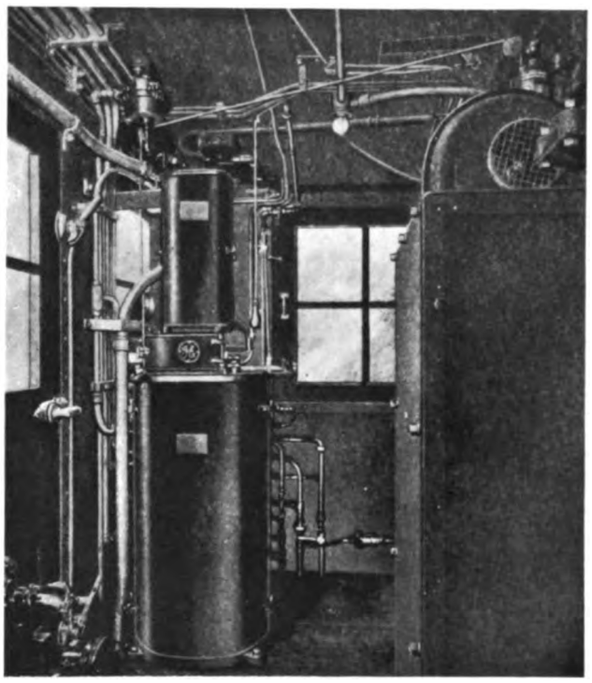
explaining why brake shoes frequently become red-hot and other serious damage is done.

With regenerative braking, the motors become generators which absorb the energy of the descending train and convert it into electricity, thus restricting the train to a safe speed down the grade, and at the same time returning electric power to the trolley for use by other trains. The strain on draw bars and couplings is reduced to a minimum, since the entire train is bunched behind the locomotive and held to a uniform speed. The electric-braking mechanism automatically controls the speed by regulating the amount of energy fed back to the line. This smooth and easy descent is in marked contrast to the periodical slowing down and speeding up of a train controlled by air brakes.

The usual speed of the electrically hauled freight train is 15 miles per hour ascending and 17 miles per hour descending the maximum grade, but half these speeds can easily be maintained with series connections of the motors should conditions require it.

In case there are no other trains between the sub-stations to absorb the power generated by a descending



Interior of Driver's Cab.

train, this power passes through the sub-station machinery, is converted from direct to alternating current and fed into the distribution system connecting all sub-stations. The power company's lines are so extensive and the load of such a diversified character, that any surplus power returned by regenerating locomotives can readily be absorbed by the system. Credit is given for all energy returned.

The advantages of regenerative braking are summarised as follows :—

Elimination of difficulties incident to the use of air brakes on heavy freight trains when descending mountain grades.

Elimination of brake shoe and wheel wear with resultant reduction in maintenance.

Reduced wear on tracks, especially on severe curves.

A probable saving of approximately 15 per cent. in the total power consumption.

Maximum safety in operation assured by a duplicate braking system relieving the air brakes.

The entire absence of grinding of the brakes, which is especially disagreeable on a heavy passenger train.

Increased comfort to passengers and reduced wear and tear on freight equipment, owing to uniform speed on grades.

The following is a summary of the advantages of electric traction on such a railway as the mountain section of the Chicago, Milwaukee and St. Paul line :—

Reduction in cost of electricity as compared with cost of coal.

Reduction in maintenance cost of locomotives.

Elimination of delays due to coaling, taking water, oil, etc.

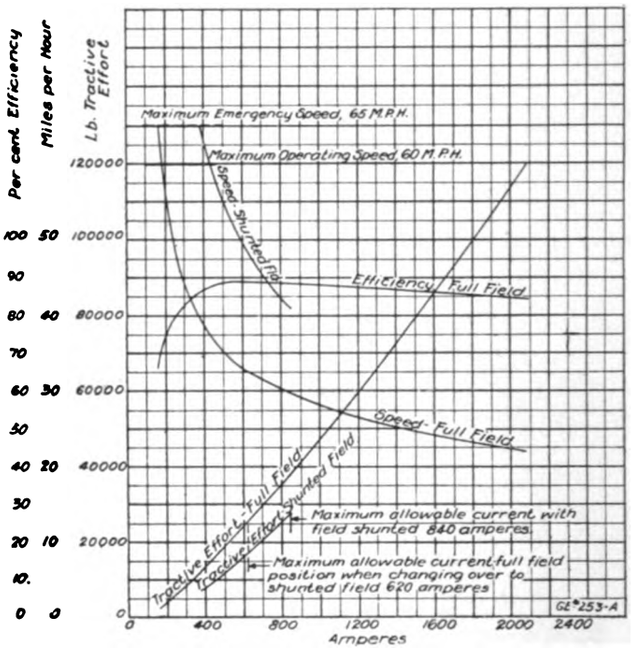
Elimination of delays due to natural causes, such as freezing of locomotives, loss of steam in cold weather, bucking snowdrifts.

Elimination of non-revenue trains hauling coal and water for steam locomotives.

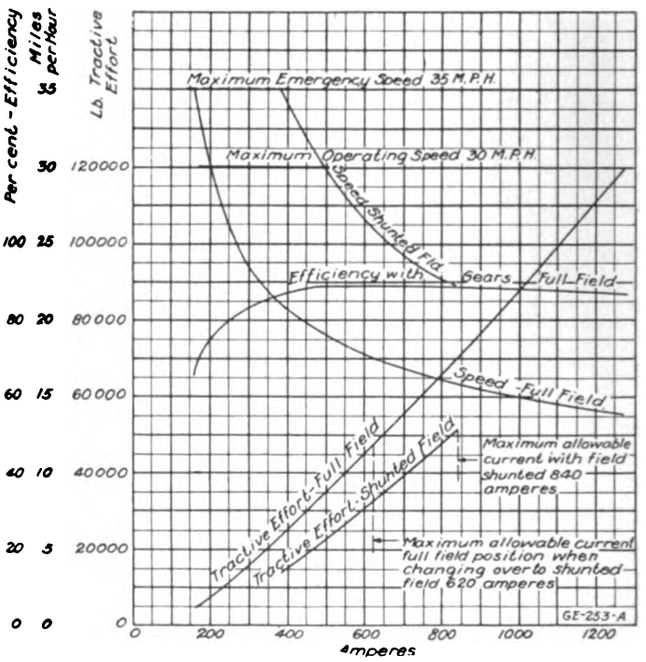
Increased tonnage per train.

Increased train speed on grades.

Greater reliability and certainty of maintaining schedules.


Per cent. Efficiency
Miles per Hour
Lb. Tractive Effort
Maximum Emergency Speed, 65 M.P.H.
Maximum Operating Speed, 60 M.P.H.
Speed - Shunted Fld.
Efficiency - Full Field
Speed - Full Field
Tractive Effort - Full Field
Tractive Effort - Shunted Field
Maximum allowable current with field shunted 840 amperes
Maximum allowable current full field position when changing over to shunted field 620 amperes
GE-253-A
Amperes

Characteristic Curves of Main Line Passenger Locomotive.


Per cent. - Efficiency
Miles per Hour
Lb. Tractive Effort
Maximum Emergency Speed 35 M.P.H.
Maximum Operating Speed 30 M.P.H.
Speed - Shunted Fld.
Efficiency with Gears - Full Field
Speed - Full Field
Tractive Effort - Full Field
Tractive Effort - Shunted Field
Maximum allowable current with field shunted 840 amperes
Maximum allowable current full field position when changing over to shunted field 620 amperes
GE-253-A
Amperes

Characteristic Curves of Main Line Goods Locomotive.

Reduction in train crew hours per ton mile.

Reduction in damage to rolling stock due to rough handling by steam engines.

Increased safety of operation on grades due to regenerative braking.

Saving in power and reduction in wheel and track wear by use of regenerative braking.

Improvement of tunnel conditions due to smoke and gas, absence of smoke and cinders which obscure scenic attractions, uniform speed, and absence of grinding brake shoes on grades, all of which accrue to the benefit of the traveller.

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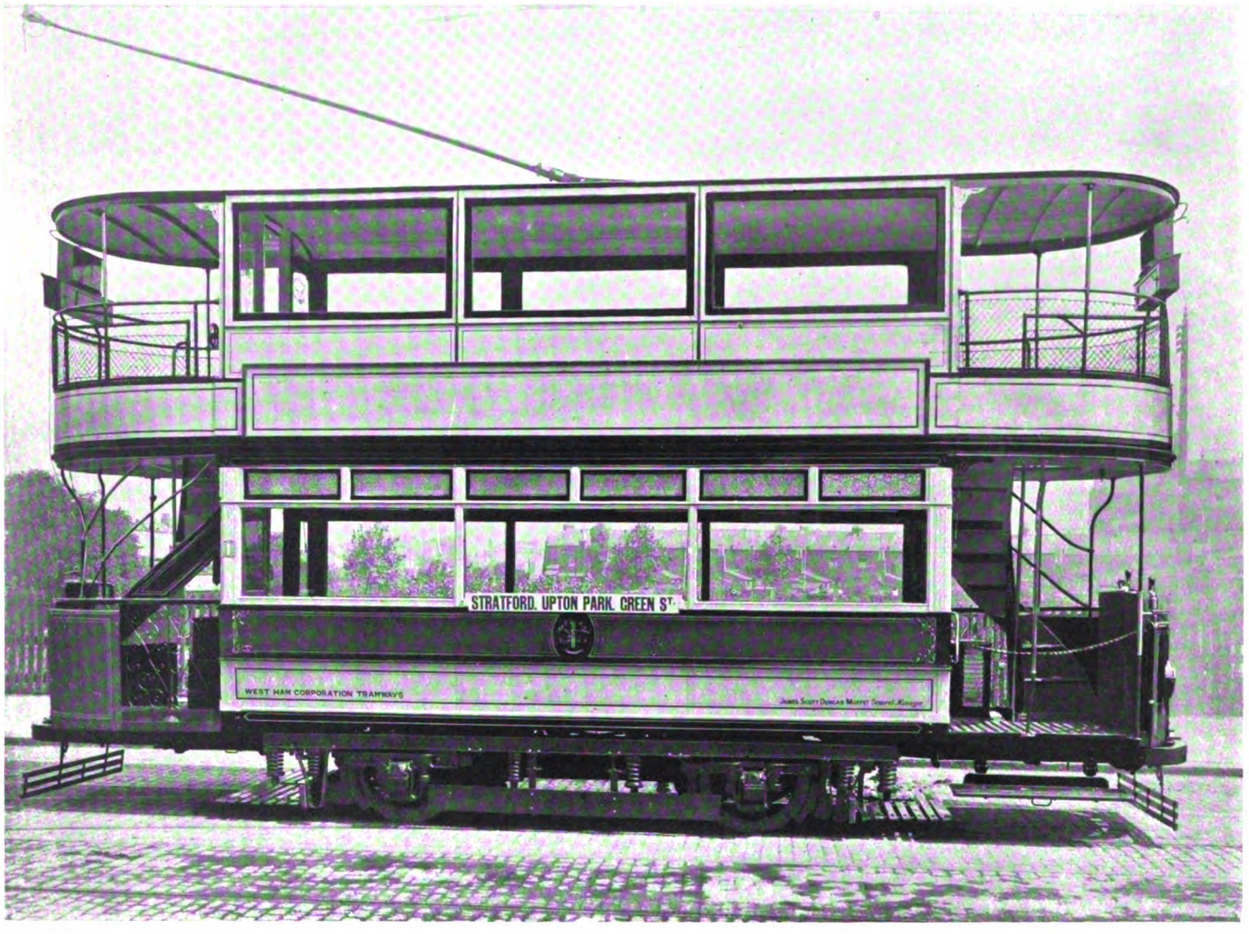
WEST HAM TRAMWAY ROLLING STOCK.

A Novel Method of Car Reconstruction.

About two years ago Mr. J. S. D. Moffet, manager of the West Ham Corporation Tramways, presented a report to the Tramways Committee on the condition of their rolling stock, much of which had been in use since 1904 when the tramways were electrified. Many of the cars, particularly the bodies, were admittedly the worse for wear owing to heavy service conditions, and Mr. Moffet emphasised the necessity of thoroughly overhauling them in order to provide for an efficient service. The bodies of a large number of the cars had become very loose, showing in some cases excessive play both longitudinally and transversely. In addition to this there was tilting of the platforms partly caused by the hogging of the bodies, this having the effect of displacing the cross beams, which took an upward thrust to the end of the platform beams at each end of the lower saloon, causing a bad break in the floor level at these points. One of the chief causes of the longitudinal and transverse movements was due to the fact that the first 93 cars were open top cars, and consequently they were not built to withstand the extra stresses set up in the body by the added weight of the top covers. West Ham, of course, is not the only tramway undertaking that has had this experience. All over the country top covers have been added to open top cars, and it speaks well for their original construction that the cars have stood the strain of the additional loads as well as they have done.

The trucks of the West Ham cars have also given excellent service, but many of them were showing the effect of the severe conditions. They have suffered particularly from the sharp curves, corrugations, and the general condition of disrepair into which the tracks had fallen after long service.

The maintenance of the rolling stock had been specially difficult owing to the diversity in the design of the cars and trucks. The car bodies had been supplied by no fewer than five makers, and not only the bodies but wheels, axles, and trucks were of different design and dimensions. Of the trucks there were no fewer than seven different types, and there were five different types of motors. While giving great credit to the Council for the effort they had made to keep abreast of the times and for the zeal that had been displayed in experimenting with different types of equipment, Mr. Moffet considered that the time had now arrived when it was advisable that the equipment should be standardised. In view of the geographical situation in relation to London on the west side, and other tramways on the east and north-east side, it seemed desirable that a larger car should be obtained to cope with the extraordinary ebb and flow of traffic night and morning. Two classes of cars, with two different types of equipment, or three at the outside, should be standardised to meet adequately the special features of the West Ham tramways. He accordingly recommended that the two classes to be standardised should be as follow :—Class A—A single truck, rigid wheel base, top-covered car with seating accommodation for 60 passengers ; Class B—A bogie car of the London County Council type, with seating accommodation for 78 passengers. The motor equipment for the smaller cars would be 35 H.P. motors, and for



West Ham Standard Single Truck Car Reconstructed with Steel Frame.

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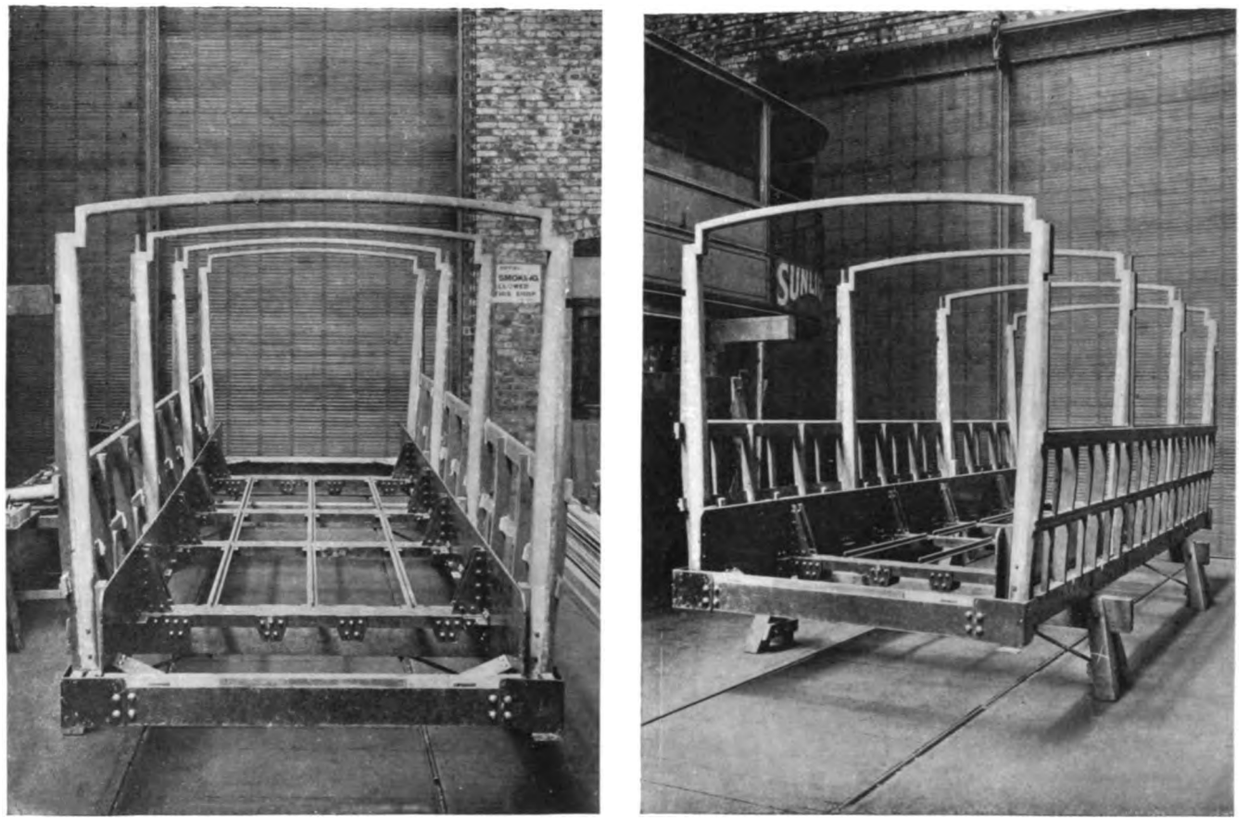
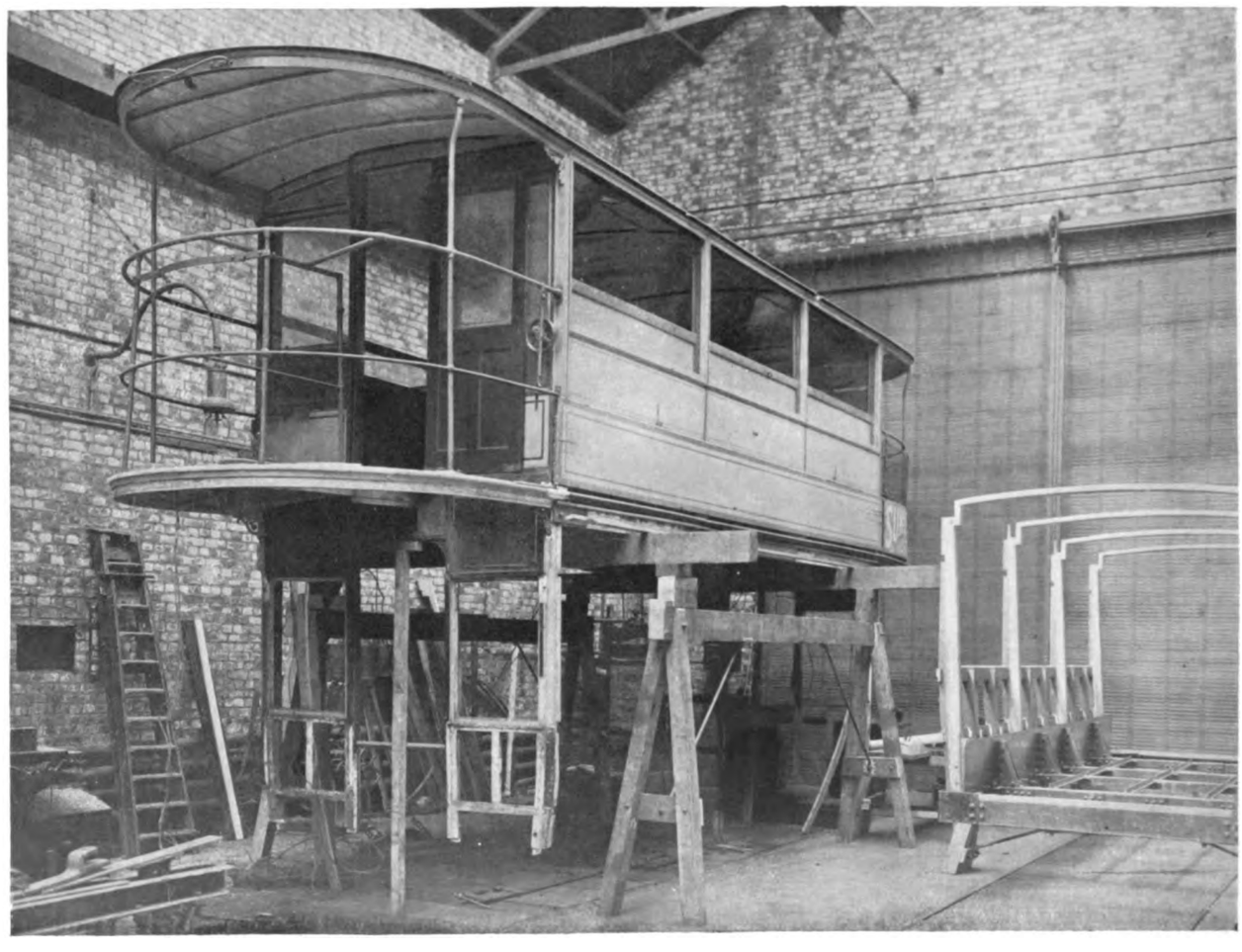


Steel Underframe Pillars and Carlines for Reconstruction of West Ham Cars.



Old Car Ready to Receive New Steel Frame.

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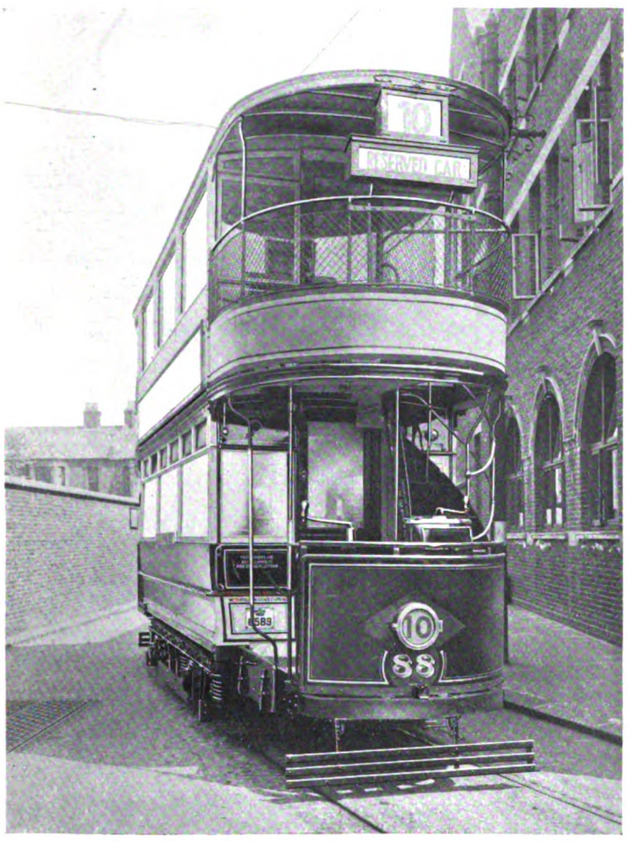
the larger cars, 45 H.P. motors. It was proposed that the existing stock of cars and equipments should be gradually brought into line with the above standards as opportunity arose, or replaced as circumstances required from time to time.

The outbreak of war delayed the carrying out of the full programme, but in the meantime the work of overhauling the rolling stock has proceeded as rapidly as circumstances permitted. During the past year forty-four single truck cars have been equipped with new motors of the G.E. 200 ventilated type, which has been adopted as the standard for the ordinary four-wheel single truck car, and 50 cars in all have been fitted with two TG controllers. Plans were completed for putting in hand the work of replacing and where necessary reconstructing the car bodies, and this work has also proceeded as rapidly as circumstances allowed.

In reconstruction, the object in view has been to



End View of Reconstructed West Ham Car.

carry out the work at as small a cost as possible, and yet at the same time to put the car bodies into such a condition that they would have practically as long a life as new cars. The method of reconstruction adopted by Mr. Moffet will be readily understood from the accompanying illustrations. Originally the bodies were, of course, entirely of wood, and they have stood the strain well; but on thorough examination it was found that the end and side pillars would need to be replaced, while the underframes were practically useless. The body, the rocker panels, and much of the inside finishing could, however, be utilised, and the upper saloon was in fair repair. In these conditions the plan was adopted of building a new underframe of steel, providing end and side pillars of channel steel and steel car-lines of suitable section. The underframe is constructed of two side girders secured by brackets to cross girders braced longitudinally as shown in the photographs. Outside the steel frames are the old wooden sills reinforced by steel side and end pieces. From these are erected the end and side pillars of channel steel, to which are welded the channel steel car-lines. The old side and end pillars are fitted into the channel pillars, and the pillars are rigidly secured in the sill. To complete the work, the girder framework of the platform is bolted to the end sills and to the first of the cross girders. The reconstruction of the cars is being carried out under the supervision of the tramways manager by the works superintendent, Mr. T. C. Winfield.

SYDNEY ELECTRIC RAILWAY SCHEME.

A copy has reached us of the report by Mr. J. J. C. Bradfield, M.Inst.C.E., on the proposed electric railways for Sydney, New South Wales, which was issued there earlier in the year. The report is elaborately produced on thick paper, and is accompanied by nearly 90 plates, the whole forming an imposing volume, as is fitting in view of the importance of the undertaking. The questions of a city electric railway and of the electrification of the suburban steam lines, particularly the former, have been discussed for years, and experts and commissions of inquiry have reported on these matters and recommended schemes from time to time. Now, however, something definite has been reached, because the work recommended by Mr. Bradfield has been approved, and in an introduction to the report, Mr. J. Davis, M.Inst.C.E., director-general of public works, states that the work will be carried out in the following order:—The electrification of the inner zone suburban railways to Parramatta, Hornsby, Sutherland, and Bankstown; the construction of the city electric railway and of electric railways to the eastern, western, and northern suburbs; the construction of two long-span cantilever bridges across the harbour of 1,600 ft. and 1,350 ft. centre spans respectively; the electrification of the outer zone suburban railways to Penrith, Campbelltown, Waterfall, the Hawkesbury River, and various other small branches; and the construction of underground tramways for the relief of street congestion. The whole scheme is estimated to cost about £20,000,000, exclusive of land resumption. Legislative powers have already been obtained for work on the city and inner suburban lines of the value of £10,000,000, this including power plant and equipment.

Mr. Davis, writing in December last, said it was anticipated that plans would be sufficiently far advanced to enable a commencement to be made at the end of April, 1916, and that four years would be occupied on the city and suburban electric railways. The work was to be carried out in accordance with an agreement between the New South Wales Government and Messrs. Norton Griffiths and Company, London, the latter to receive a payment of 5 per cent. on the value of the work performed. The contractors have now begun the preliminary work.

Mr. Bradfield during 1914 carried out investigations on city transportation both in Europe and the United States, and his report touches upon many topics. There are elaborate statistics as to Sydney passenger traffic, as to the power required, and recommendations as to the types of rolling stock to be adopted. It is not clear what is the total length of all the railways and tramways concerned, but the inner zone railways measure 63 miles of route, or 200 miles of track, while the outer zone extends to 95 miles of route, or 200 miles of track. The new city railway is to be a loop line round the city.

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A Great Railway Electrification.

A comprehensive description is given in our present issue of the electrification of the mountain section of the Chicago, Milwaukee and St. Paul Railway. This is the most extensive scheme of the sort that has yet been carried out, and in many other respects it presents features of peculiar interest. The section runs for 440 miles through wild mountains, crossing three ranges in succession, and the gradients accordingly are excessive. Electric traction has been adopted, not because a frequent service of trains is required, but because greater economy and efficiency are to be obtained in hauling the few enormously heavy trains employed. A great step in advance for the high-tension direct-current system is marked by the employment of direct current at 3,000 volts on the trolley wire. Such a high direct-current pressure has not hitherto been used on a commercial scale, although it was successfully employed experimentally on a Lancashire branch line. Sub-stations are correspondingly far apart. The locomotives are the most powerful that have ever been built. Each develops normally 3,000 H.P. and can haul an 800-ton passenger train at 60 miles per hour, or a 2,500-ton freight train at 16 miles per hour. Regenerative control in descending gradients promises to play an important part in the system, and in such circumstances it ought to prove of much value. Mechanical braking of a 2,500-ton train down long gradients of 2 per cent. is a serious matter. Not only because the electricity required for traction can be got very cheaply from hydro-electric stations, but because of the heavier trains which can be hauled, the higher speeds, and other features, such economies are expected as will far more than pay interest on the additional capital invested. Electric traction on such a scale presents many problems, and the working of the railway will be watched with interest by engineers throughout the world.

"The Right Man in the Right Place."

Many will recall an amusing skit in *Punch* some weeks ago on the way in which men with special knowledge are often utilised in the army. A public school man was represented as engaged on "kitchen fatigue duty," when to him entered a friend with similar training, who inquired how on earth he had got that job. "Influence, dear boy, sheer influence," was the reply. The joke was no doubt founded on a knowledge of the sort of thing that is going on. In the domain of engineering numerous cases can be found of men of the highest training being kept on duties where their knowledge is thrown away. We know of one instance among others in which an electrical engineer, an honours graduate in science of London University, and a man with workshop and practical experience, who, enlisting in the Royal Engineers, was kept after his period of training partly at kitchen work and partly at erecting tents and keeping them in order. The supreme elevation he appears to have reached is that of an ordinary sapper in a tunnelling company. In another case, a chartered accountant from the city of London was kept washing dishes for three months. One of our contemporaries mentions the case of an electrical engineer, a London B.Sc., with first-class honours, much of whose time is taken up by listening to elementary lectures on electricity. Yet we are told this is an engineer's war. A wireless telegraph expert—a class of man it is said urgently needed in the army—has been for two years a private in an infantry regiment, and this in spite of representations in the proper quarter. Some time

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ago, before compulsory service was introduced, a letter from an engineer was published in the newspapers stating that in view of a remark in a speech by Mr. Lloyd George that engineers with knowledge of works management were urgently needed for munition factories, he had offered his services, but had received no reply beyond formal acknowledgment of his letter. Many similar incidents could be cited, and it is little wonder that it has become a standing joke in some regiments that the authorities first find out what sort of work a man is specially suited for and then put him to something else. Evidently there is little hope for the engineer in the army unless he can enter by some favoured channel or, if fortunate, through the medium of a training corps. One of the men above referred to declined to enter a training corps when he enlisted now nearly a year ago, as he wished to learn a sapper's duties from top to bottom in the first place, and prospects of promotion were held out to him. Needless to say, the prospects have not materialised. Facts such as these indicate that through sheer lack of thought we are wasting a great number of men who possess special knowledge that is urgently needed in a hundred places. Officers in positions of great responsibility appeal for men with such knowledge day after day. Such men are available in large numbers. Is it unreasonable to expect that some method should be evolved of discovering them and of putting them where their knowledge and experience can be used to the best advantage?

Collection of Used Tickets.

Among the numerous matters in which the war has forced home the truth of the saying that an ounce of practice is worth a ton of precept is that of the supply of tickets. Pulp for the manufacture of tickets is one of the imports upon which restrictions have been placed in order to limit the strain upon the mercantile marine. While it does not appear that ticket using organisations have yet had their supplies cut down by one-half, as the contractors feared would be the case in February last, an increase in the price has been inevitable. It is perhaps unavoidable that a large proportion of the tickets issued on one metropolitan undertaking should be so thin that conductors have difficulty in cancelling them without tearing the material. When the call for the exercise of economy is insistent it is the reverse of pleasing to see passengers alight and litter the pavement and roadway with their tickets at a time when there is difficulty in finding labour to keep the thoroughfares clean. Again, the cars are rendered untidy by both the single and return ticket holders, the latter postponing the throwing away process until they come on a car the following day, only a small minority possessing sense enough to make a practice of discarding the old ticket before they leave home. Under present-day conditions, general managers would be glad to learn of the experiences of those tramways where used ticket boxes are in vogue. What has happened at Glasgow would seem to offer encouragement for the adoption of that system. Shortly after the receptacles had been placed on the city's cars we reported that in the first week the proceeds of the sale of the used tickets were sufficient to pay the cost of providing the boxes. We should imagine, however, that in the average English town it is useless to adopt this course and to expect passengers to place used tickets straightaway in the boxes. They would doubtless require some reiterated exhortation. An even more effective method of economy would be to adopt the method pursued at Burnley by Mr. Mozley, and to have all tickets collected by the conductors, thus providing a check on fares, as is the case in railway travelling. It would be interesting to learn whether Mr. Mozley has carried out the idea on the Burnley Corporation Tramways, and, if so, how he overcame difficulties that suggest themselves to any manager who considers the advisability of adopting that course.

The Partially Disabled as Motormen.

Greater value would have been attached to the report of the Home Office Committee on the question of the licensing of partially disabled men as drivers of public motor vehicles if the Committee had published the minutes of the evidence, particularly in relation to tramcars and motor omnibuses. "For reasons of national economy the minutes of evidence taken before us have not been printed," the Committee state: and they consequently "made the report more full in order to explain the nature

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of the evidence tendered." Elsewhere in this issue is reproduced fully such portions of the document as relate to public service vehicles. One reason why we should like to have had the evidence on which those portions of the report are based is that in one respect there was a difference of opinion among the witnesses who were called to speak on the tramway side. Although the scope of the Committee's investigations was limited by the Home Secretary to the Metropolitan police area, witnesses were called from, and evidence was tendered by, the Chief Constables' Association, which is a provincial body, while the tramway evidence included that of the general manager at Liverpool, the deputy chief officer of the London County Council, and the general manager at West Ham. The divergency of opinion among the tramway witnesses related to the possibility of a man with an artificial foot being able to drive. In this connection there is one point that none of the witnesses nor the Committee seem to have considered, and that is the short life of an artificial leg. During the war it has been found that the substitutes in ordinary use have to be renewed every five months. In the case of a motorman there is reason to believe that the wear and tear would be greater, for while he supports himself mainly on his left leg, the right foot has to engage the pawl of the hand brake. There is an even more busy claim upon one foot or other for sounding the bell, while the sanding is also a matter for the feet. Upon these two last-mentioned points the report is silent. With the main conclusions of the Committee no fault will be found, for all who are associated with the work of conveying passengers will agree that the work of a driver is so exacting that it is not fair, either to the man himself or to the public, that he should be under the disadvantage of even partial physical incapacity.

New Administrative Power.—The Police (Miscellaneous Provisions) Act, which came into operation on August 3, gives to the Home Secretary power to order occupiers of factories to make special provision for meals, rest-rooms, etc. The Act seems to have been instituted to meet special conditions of war work. In munitions and controlled factories the need has been experienced of a skilled supervisor to keep a guiding hand on the welfare of the workers, and in order to train them in Leeds a new department has been set up in the local University. It may be worth while for tramway authorities to consider whether the employment of women conductors comes within the Act. In many places special provision has been made for their requirements, extending to the provision of food and rest-rooms.

TRADE AFTER THE WAR.

In British industrial and commercial circles the continued unwillingness of the Government to constitute a Ministry of Commerce is causing no little disappointment and anxiety. The Prime Minister seems to be specially opposed to the idea, though his antagonism to the scheme appears to arise mainly from the fact that there are Ministers enough already. Yet the Government are evidently gravitating towards the constitution of a Ministry of Labour, as witness the recent formal recognition of Mr. Arthur Henderson as labour adviser to the Government, his resignation of the office of President of the Board of Education and his appointment as Paymaster-General. There does not appear to be any particular objection to having a Minister of Labour, and the existence of such an office may be helpful in effecting readjustments after the war. The Board of Trade is heavily burdened with its multifarious duties and responsibilities. But labour is only a part of the great machine of commerce and industry, and on the prosperity of the latter labour must depend. It is, therefore, with the creation of a Ministry of Commerce that a beginning should be made, and we are glad to observe that the Associated Chambers of Commerce do not intend to allow the matter to rest. In the latter part of August they presented a memorial to the Prime Minister urging the Government to take immediate steps to create a Ministry of Commerce and Industry, with an advisory council consisting of representatives of the Foreign Office, the Colonial Office, the India Office, the Dominions, and the leading commercial interests of the Empire. Various detail proposals are made, and it is clear that such a Ministry so advised could be of enormous assistance in promoting Empire trade.

In the meantime, the leading organisers of industry are gradually putting themselves in a position to exert the influence which, for the benefit of the Empire and its workers, it is to be hoped that they will exercise in the fullest measure. The Federation of British Industries Association, which has been established as a central organisation of manufacturing interests, promises to be a valuable force. Among the bodies that have been absorbed in the new association are the Institute of Industry and commercial and powerful industrial groups in Manchester and Birmingham. The Institue of Industry imposed the condition that it imposed, viz., that the minimum amount of the fund to be raised under the new arrangement should be £100,000, and this has been more than fulfilled. The main object of the new organisation is the investigation and the prosecution of a definite line of policy in regard to the various matters affecting British industry, both now and after the war. It is a guarantee of the soundness of its policy that Mr. F. Dudley Docker has been appointed president and Sir William Peat chairman. Under such leadership neither courage nor energy will be lacking for what promises to be a movement which will have momentous consequences in the commercial struggle upon which we shall enter after the war. The commercial community will need indeed to cultivate greater breadth of mind, to take a more serious and a finer view of its responsibilities; but it will need above all intelligent and forcible leadership. The times have changed, and we must change with them or yield the palm to younger nations. The Federation of British Industries Association has been formed in the fullness of time. Its work lies ready to hand.

Some importance attaches to the proceedings at a luncheon given in London on August 17 by the British Empire Producers' Association for the purpose

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of meeting Mr. G. H. Pritchard, delegate for Australia at the Sugar Producers' Conference, on the eve of his return to Australia. The programme of the Association for the development of Empire trade is well in line with that of other bodies, and for this reason it would be well to have more co-operation among the different associations with similar aims, with union where practicable and with federation in other cases. The United British Industries Association affords a precedent and encouragement in this direction.

THE FUTURE OF EDINBURGH TRAMWAYS.

THE POSITION AT THE END OF THE LEASE.

The Edinburgh tramway question in one form or another goes back for nearly a quarter of a century. At present the lease of the lines to the Edinburgh and District Tramways Company has only three years more to run, and the Corporation are much preoccupied with the question of future arrangements. They are reported to be still uncertain as to what system of traction they will adopt for the tramways when the present lease expires in 1919. The interim report on the subject by Mr. J. B. Hamilton, general manager of Leeds City Tramways; Mr. J. A. Brodie, city engineer of Liverpool; and Mr. A. H. Campbell, burgh engineer of Edinburgh, to which we referred in our issue of August 10, appeared to be definite enough; and more enlightenment may be looked for in the full report, which is promised at an early day. The question will remain whether the Corporation will adopt and act on the report. Some facts on the situation are worth considering.

When in the early 'nineties the Corporation took over the then existing tramways, mostly worked by horses, though with a few miles of steep gradient lines operated by the cable system, electric traction was in its infancy. The overhead wire system was beginning to come into use in Britain, but Edinburgh would have nothing to do with it. Overhead wires in Princes Street were regarded as unthinkable. The electric conduit system was unknown except in theory. The steep gradients on many of the routes rendered the problem of braking a serious one if electric or any kind of automobile cars were employed. The cable system was a pronounced success in America on lines where there was sufficient traffic, and it was in use with good financial results on a few routes in this country. It also had the advantage of great safety on steep gradients. In the circumstances of the time and place we advocated the adoption of the cable system for Edinburgh, and the Corporation took the same view. The result was that the whole of the tramways of Edinburgh came to be worked by cable traction, and the scheme was more elaborate than anything of the kind in this country.

The Corporation spent a great deal of capital on the work. The street construction was the best obtainable; the pits at junctions with an elaborate scheme of auxiliary cables were large and costly; the power-station buildings represented the last word on the subject, even architecturally. The undertaking was leased to the Edinburgh and District Tramways Company, who had only to provide the cars, and the rent eventually agreed upon was no less than 7½ per cent. per annum on the capital expenditure. Municipal operation had not in those days reached its present vogue. It certainly says much for the economy of operation of the cable system that, in a town of the population of Edinburgh and with suburban routes having a light traffic, the company should have been able to pay the rent on a relatively huge capital, and secure a small profit for the shareholders. In 1915 the total receipts amounted to £311,877, but £114,174 were required to meet the rent charge, and the working expenses were £169,583. The gross balance was thus only £28,120, while the net profit was £5,800. As the company's issued capital stands at £92,500, the return to the shareholders is comparatively small.

Seven years after the cable system was completed, when overhead wire electric traction had been adopted in many other towns, scoffers regarded the Edinburgh undertaking as out of date. The main reasons for condemning it appeared to be the following:—(1) The cables running in the conduits made a noise; (2) there was delay at junctions owing to the use of the slow-speed auxiliary cables for rounding sharp curves; (3) the speed was slow; (4) the system was subject to breakdowns. In regard to the first of these, the noise is undeniable, but it is only audible when there is no or next to no wheel traffic in the street. Some noise of the kind is inevitable. As to the second point, with the method employed the delays are unavoidable, but that they are unimportant is proved by the fact that the third objection is unfounded. The cars are not slow. It has been proved statistically that the average car speed, including stops, is higher than that on many electric tramways in large towns. There are, of course, no fast rushes for short distances, as the maximum speed is that of the cable, but this is compensated by the facts that acceleration after each stop is rapid, and that there are comparatively few involuntary stoppages in Edinburgh caused by other traffic being in the way.

In regard to breakdowns, the complaint has been made with some justice during the last year or two, as insufficient attention appears to have been given to maintenance of pulleys in the cable conduits. Recently, however, marked improvement in this matter has been, and is continuing to be, effected. The tracks and cable machinery have already been put in first-class running order; and a very great improvement in reliability and punctuality has been obtained. It will accordingly be noticed that none of the objections mentioned are of substance, except possibly the noise caused by the cables, and to most people that is not a serious matter if the pulleys are properly maintained.

The question now is what the Corporation will do. At the end of the lease they will no doubt take the working of the tramways into their own hands. That we may regard as determined upon. The continued use or supercession of the cable system is, however, an open question, and it will be long and strenuously discussed in the Council and by the public. The experts to whose report we have referred have apparently formed the opinion that it is practicable to instal another system while the cable cars continue to be worked, so that immediately on the expiry of the lease an electric service could be commenced. They think also that it would be possible to design the electric system in such a way that ultimately there would be no overhead wires in the central parts of the city. As it would not be practicable to make such a change immediately on expiry of the lease, they propose that the overhead system should be used in the first place throughout the city, the formation of electric conduit sections being proceeded with later if desired. No automobile system is suggested. What the experts advise is apparently the abolition of the cable system as early as possible. Poles and wires would be erected while the cable cars continue their service, and when the lease expires and the electric installation is complete the electric cars would at once be run on the same rails as are now used by the cable cars. The

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objection to such a course is that the rails are not suitable for electric traction. They could not withstand the wear for more than a few months, and even if an electric car of much lighter weight than has hitherto been used were designed, rails of the present type would be quite inadequate. The wear on rails of cable and electric cars is not comparable; in the latter case every car is a locomotive, dependent for its motion on adhesion between wheel and rail. A heavy rail is therefore indispensable. If electric traction is decided upon, thorough rail renewal can hardly be escaped.

Here is the crux of the matter. Is it likely that the Corporation, which now has a workable tramway system constructed from the proceeds of loans of which a large portion yet remains to be repaid, will be permitted to raise new capital during the continuance of the war or for some time after it? Under regulations now in force no local authority can raise fresh capital except with the consent of the Local Government Board and of the Treasury. That consent is not given unless it can be shown that the work to be carried out is of urgent necessity.

It seems hardly probable that these Government departments will consider that the installation of electric traction is of urgent public necessity, seeing that a tramway system capable of carrying all the people who desire to use it is already in existence. Supposing, however, that that difficulty were got over, and that the money could be borrowed, it might be found difficult or impossible during the war and for some time after to get from manufacturers the electric cars, the poles, the wire, or any of the equipment required. The lease has only three years to run, the end of the war is not yet, and it may be some little time after its end before manufacturers are ready to execute big orders of the sort.

On the whole it would seem wise to go on with the cable system in the meantime. It can be put into thorough repair, and its operation can be continued by the Corporation until times are more favourable for making a change. That, at all events, would seem to be a conclusion that must commend itself to ratepayers under the present conditions of financial stress.

PARTIALLY DISABLED MEN AS DRIVERS.

Report of the Home Office Committee.

On August 11 a report was issued by the Committee appointed by the Home Secretary to consider whether, having regard to the normal conditions of traffic in the Metropolis, licences to drive motor cabs, motor omnibuses, or tramcars should be granted to men who suffer from some partial physical disability by loss of a limb or other similar cause, and, if so, within what limitations. The members of the Committee were Messrs. F. L. D. Elliott (chairman), C. W. Bowerman, M.P., J. W. Orde (secretary of the R.A.C.), R. J. Simpson, and A. Smith (president of the Union of Licensed Vehicle Workers), Major A. Tudor Craig, Sir Frederick Eve, F.R.C.S., and Sir Albert Stanley. Mr. H. A. Tripp, of the Metropolitan Police Office, was secretary to the Committee. In the course of their report they state that "we entered upon our inquiry with a strong and natural sympathy for the men who, having suffered some serious physical disability in the service of king and country, are liable to be thenceforward handicapped in earning their livelihood. While it is greatly to be desired that these men should not suffer in the matter of earning their livelihood, it is of paramount importance that the public should not be exposed to undue risks. It is essential not to reduce the standard of efficiency in drivers of public vehicles, since even under the present system (which virtually excludes men so incapacitated) there is no margin of safety to spare. While the total number of accidents shows a tendency to decline, the numbers of serious cases shows an upward tendency. In the case of private motor cars and trade and commercial motor vehicles, we feel that the increase in the aggregate must be assigned (partially at least) to the introduction of labour of an inferior—or less highly trained—quality. This consideration has a direct bearing on our investigation.

Safety of the Public the First Consideration.

We feel no doubt that in the case of public vehicles, the logical outcome of introducing drivers who are less efficient would be an increase of the street casualties and a serious additional toll of fatalities. With this opinion definitely formed in our minds, we are not prepared to take the responsibility of recommending that less efficient drivers should be admitted. There is no margin of safety at present, and the licensing authority is not—in our view—justified in taking any steps which may increase the number of accidents and fatalities in the streets of the Metropolis. This conclusion, at which we arrive at the outset, obviously narrows the field of our labours. Our problem has reference now only to the question of absolute efficiency. If a disabled man is equal to a sound man, there can be no objection to his admission as a driver. If, on the other hand, motives of sympathy and sentiment should induce the licensing authority to admit a man of impaired efficiency—even though the handicap were slight—then, as we have said, he would take a responsibility which we could not recommend. The safety of the public is the first consideration. It seems to us highly important at this point that one fact should not be lost sight of. The driving of public vehicles is incomparably more exacting than the driving of private or even trade vehicles. The driver of a vehicle of the latter classes is able, to a considerable extent, to choose his own routes if not his own times; he is able generally to avoid known centres of congestion, and can always stop if he is in a difficulty. The driver of a public vehicle, on the contrary, must proceed by whatever route his employer or his fare directs. His driving is, moreover, for the most part in populous districts where traffic is heavy. This distinction appears to us to be a matter of the first importance."

Summary of Recommendations.

"We arrive at our conclusions with considerable regret. We are, however, deeply impressed by the potential risk to the public if drivers who had lost limbs were employed, and we have constantly borne in mind the responsibility which devolves by statute on the Commissioner of Police to satisfy himself as to the 'fitness for such situation' of each candidate for licensing whose application he approves. Were we not fully satisfied that the interest and safety of the public are at stake, we would gladly refrain from recommending that the door should be shut on this avenue of employment for men who have suffered in their country's cause and possess a moral claim on their countrymen. But, being entirely convinced, we have no option, and can only record our considered opinion that having regard to the normal conditions of traffic in the Metropolis—licenses to drive motor cabs, motor omnibuses, or tramway cars should not be granted to men who have suffered the loss of an arm, hand, leg, foot, or eye. In the case of injury to one eye, provided the other eye is sound and the injured eye retains fair vision, we think a licence might be granted, each case being, of course, decided on its merits. As regards other minor disabilities, such as loss of one or more fingers, or other damage to the hands, limitation of movements of joints of the upper or lower extremities, or shortening of the lower extremities, and the results of injuries to nerves of limbs, we recommend that the existing practice continue to be followed, and that each case be dealt with on its merits at the discretion of the Commissioner of Police with, in doubtful cases, a power of reference to a special medical referee."

Outline of the Inquiry.

The Committee heard evidence from representatives of the licensing authority of the Metropolitan Police, the owners of public service vehicles, the licensed men, the provincial police and licensing authorities, the Royal Naval and Army Medical Services, the medical advisers to the London County Council, and the London General Omnibus Company, and the insurance companies. Evidence was invited from incapacitated persons who had informed the Committee that they were competent drivers and were willing to help in the inquiry, but none accepted the invitation to give evidence. The instructor at Roehampton House, who trains men who have lost a limb to become motor drivers, attended, and the Committee witnessed a driving demonstration by drivers who had lost a leg during the war. For reasons of national economy the minutes of evidence have not been printed, but the report is made more full in order to explain the nature of the evidence tendered. The Committee place on record their appreciation of the zeal, tact, and efficiency of the secretary, and they "were impressed by the complete grasp of the subject" shown by Superintendent Bassoon, of the Public Carriage Branch, Scotland Yard, his evidence being referred to as "admirably fair and lucid."

In addition to representatives of motor cab companies and drivers, and of motor omnibus drivers, the witnesses included Mr. H. E. Blain, operating manager of the London General Omnibus Company, Mr. T. Clarkson, managing director of the National Steam Car Company; Mr. J. S. D. Moffet, general manager of West Ham Corporation Tramways; Mr. J. K. Bruce, deputy chief officer, London County Council Tramways; the chief constables of Liverpool, Manchester, and Bristol, as representing the Chief Constables Association, who submitted a body of written opinions from their colleagues in various parts of the country; three officers of the R.A.M.C., Royal Navy, and A.S.C.; Sir John Collie, consulting physician to London County Council; Dr. Davis, medical adviser to the London General Omnibus Company; and Mr. A. C. Young, of the Accident Offices Association.

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Attention was first directed to the statutory powers under which the Commissioner of Police exercises his licensing functions, and to the procedure before a licence is granted. A man applying for motor omnibus or cab driver's licence is required to pass a practical examination of his ability to manage the vehicle, and to possess a satisfactory knowledge of localities. An applicant for a licence to drive a tramcar propelled by other than animal power can only be granted such licence on producing a certificate of competency from the company or proprietor who intends to employ him. The Commissioner of Police reserves the right to test tramway motormen by his own officers should he consider it desirable to do so. An applicant for a licence is given a form of medical examination which must be signed by a qualified registered medical practitioner.

Omnibus Control.

The report gave a *résumé* of the weights, methods of control, etc., of motor cabs and omnibuses, the latter including the L.G.O.C. "B" and "X" types, Daimler "CC" type, Straker-Squire "Y" and "CO" types, the De Dion, Clarkson steam, and Tilling's petrol-electric. Reference was made to the pressure required to perform the various operations of cranking, and working the clutch and brake pedals. The gross weight of an omnibus is six tons, of which approximately one-third is on the front axle and two-thirds on the rear axle. The estimated pressure requisite to withdraw the clutch is 55 to 65 lb., and the pressure required to apply the footbrake increases according to weight, speed, gradient, and the distance within which the vehicle is to stop. There is no retaining gear to keep the clutch and brake pedals depressed, and the pressure must therefore be maintained by foot power. Cranking an omnibus engine required great strength and skill to enable one man to perform it, and when the engine is cold two men have often to perform the task. The licensing authority deems it essential that every driver should be capable of starting the engine, as dislocation of traffic would otherwise quickly result in the event of involuntary stoppage. Adverting to steering, the report observes that the steering of a 6-ton vehicle on heavy solid tires requires much more physical strength than steering a cab of about 25 cwt. In order to render the former as easy as possible the speed of the worm is altered, requiring more turns of the steering wheel, but less effort. It is impossible with vehicles of this type for a man to make a turn without the use of both hands.

Physical Effort of a Motorman.

No printed conditions are issued by the licensing authority as to the construction of tramcars, but the Committee submit an explanation as to control by the motorman to indicate the physical effort required to drive those vehicles. The weight when laden is from 14 to nearly 20 tons, and the highest speed permitted by Board of Trade Regulations is 16 miles per hour, except in the case of subway cars, which are allowed higher speed in the subway. Each car is fitted with two brakes, viz., a hand and an electric brake. The hand brake upon each type is similar in principle, but differs slightly in detail. It consists of an upright spindle, at the top of which is a wheel or cranked lever. At the lower end above the platform is a toothed wheel into which engages a pawl or "dog" for the purpose of retaining it in position. Underneath the platform is a coarse worm, around which is wound a chain or similar pulley by which the brake blocks are drawn on to the wheels. In all cases this operation is performed by the right hand, and the pawl or "dog" worked with the right foot.

Electric brakes may be divided into two classes, rheostatic and magnetic. In the former case the fact of the current being cut off from the motors, while the wheels rotate the armature, causes the motors to be turned into dynamos, each generating its own current. The "work" thus performed acts as a retarding force to the car and brings it to rest, but as soon as this happens the hand brake must be used to retain it at rest, because the stoppage of rotation naturally stops the generation or "work" done. In the magnetic brake the first principle of the rheostatic also applies, but the current generated by the motors being turned into dynamos is utilised to magnetise iron shoes which are thus strongly attracted to the rails, and give, in addition to the retardation by the "work" done, a strong frictional resistance to the progress of the car by means of the attraction of the magnetised shoes to the rails. In some cases the magnetised shoes are made to operate the ordinary brake shoes on the periphery of the wheels through rocking levers. In this class also the hand brake must be used to retain the car as soon as it has been brought to rest. As a tramway car will "get away" upon even a very slight gradient, the operation must proceed practically simultaneously.

Upon the tramway systems where the cars are fitted with the magnetic brake, that brake is used as the "service" brake, but upon other systems (such as the London United Tramways) the hand brake is the "service" brake, the rheostatic being an emergency one. The operations of the rheostatic and magnetic brakes so far as the driver is concerned are similar and simple, requiring very little physical effort.

At the top of the controller are two handles or levers, the larger called the controller handle, the smaller the reversing lever or key. In ordinary running the reversing lever is pushed forward and the controller handle can then be turned notch by notch on the power side until the full parallel position is reached. By this operation the car is put in forward motion. When the car is to be stopped the controller handle is brought back to the "off" position, and then continued through the brake notches until the car is brought to rest; but, as already pointed out, the necessity for manipulating the hand brake almost simultneously with the power brake renders the full use of both hands necessary. At that moment the whole weight of the body is thrown on the left leg. Again, as a last resource, in the event of other brake methods failing, when the driver must stop his car as best he can, he has to "short circuit" his motors; to do this he pulls the reverse lever in the direction contrary to that in which the car is travelling, and throws his controller handle over to the power. This, though likely to damage the motors, is pretty effective in stopping the car dead.

Quickness of movement with both hands, coupled with a readiness to use the hand brake or perform such other movement as circumstances require, are obviously essential to this manœuvre. The driver has also under his feet the "sander" and gong pedals, which are operated by the right or left foot as may be convenient. Some cars have an automatic "sander," whereby sand is caused to flow whenever the electric brake is applied, but these are uncommon.

Types of Disability—Question of a Seat for Motormen.

A return of the licensed men who, so far as the police are aware, have joined H.M. forces, shows that after deducting the number of conductors, a total of 7,157 drivers is left, of whom 5,149 were motor omnibus and tramcar drivers, and just under 2,000 were motor cab drivers. The great majority had entered the army as drivers of mechanical transport vehicles, and the Committee assume that the wastage amongst such drivers will not be abnormally heavy. It is therefore to be hoped that the great majority will return to their civil occupations.

The report proceeds to consider seriatim the various types of partial physical disability from which men presenting themselves for licences might be expected to suffer, namely, loss of hand or arm below the elbow, loss of arm above the elbow, loss of foot or of leg below the knee, loss of leg above the knee, loss of eye, and minor disabilities, such as one limb shorter than the other, loss of some fingers, stiff joints, etc.

Reasons are given in each instance why the Committee arrived at the conclusions already reproduced. It is mentioned that the National Steam Car Company took the view that a man with an artificial foot would be capable of driving a steam omnibus. It would apparently be necessary to provide a hand throttle instead of a foot throttle, imposing increased labour on the hands. The Committee are definitely of opinion that the statutory duty imposed on the Commissioner not to license men who cannot satisfy him as to their fitness must preclude him from licensing a man who has lost either foot.

Turning to the case of a similar disablement in relation to tramcar driving, the Committee say: —"Here again we find divergency of opinion, but the objections as well as the arguments in favour come from different sources. A representative of the London County Council was fully prepared to entertain the possibility of a man with an artificial foot being able to drive, while the manager of the Liverpool Tramways is inclined to take the same view, at all events as regards the left foot. The manager of the West Ham Corporation Tramways, speaking for the Tramways Association, and the Chief Constable of Bristol speaking on behalf of the Bristol tramways, are of opinion that a man must be in possession of all his limbs.

"As we have pointed out, the tramcar driver supports himself mainly on his left leg, while the right foot has the very important function of engaging the pawl or "dog" of the brake. As regards the hands, the left hand is required for the controller handle and the right for the brake. There can be little doubt (as already said) that the tramcar driver must have both his hands, and we are of opinion that upon the tramcars as at present designed it is also essential that he should have both his legs and feet. The question has been raised whether it would be possible to license men if a seat could be provided. We think it hardly necessary to take this point into consideration, as we are informed that the tramcar would probably have to be re-designed; and since we understand that a tramcar is continually being renewed in its various parts, and thus has an almost indefinite lease of life, the question hardly seems to come into the region of practical politics. If a seat were provided on a tramcar of the present design, the man would be continually jumping up, and would get very little relief. In these circumstances we are forced to conclude that a man who has lost either foot could not safely be licensed to drive a cab, omnibus, or tramcar."

Seventeen pages are devoted to various appliances relating to the mechanical and other conditions required in motor cabs and omnibuses submitted for licensing, passes and failures at driving examinations, refusals of driving licences, numbers of licences issued, and returns showing the number of persons killed and injured by vehicles in the Metropolitan police area during the years 1913, 1914, and 1915. Power-driven vehicles killed 424 persons in 1913, 493 in 1914, and 660 in 1915. Fatalities attributed to horse vehicles in the three years were 184, 146, and 185. Persons injured by power-driven vehicles totalled 13,183 in 1913, 14,638 in 1914, and 10,366 in 1915. Horse vehicles caused 10,582 cases of injury in 1913, 10,832 in 1914, and 9,501 in 1915.

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TRAMWAYMEN WITH THE COLOURS.

ROLL OF HONOUR OF THE FALLEN.

From ninety-one municipal and seventy-three company tramways in the United Kingdom 27,814 employees had joined the Army or Navy up to the beginning of August. For the returns from which these figures are compiled we are indebted to the courtesy of the tramway managers, from whose ranks representatives have also gone to take their part in upholding the honour of the Empire and the liberties of Europe. The electrical officers of the undertakings are more numerously represented by those who have transferred to the national services, for in their ranks are to be found a larger number of men of the required age. It is necessary to mention that the foregoing figures do not include the whole of the power-station staffs, who in many towns are grouped as employees of the electricity committees, as distinct from the tramways committees. From the figures relating to tramwaymen with the colours that were published in our issue of May 13, 1915, it will be seen that up to the end of April of that year 18,057 men had enlisted from 161 undertakings. The latest figures show an increase of 9,757.

In commenting upon the former returns we remarked that "to the uninitiated it may seem a mystery how the tramway services can be carried on without the enlisted men; but much has been done by engaging temporary workers, by modifying services, and by the hard and faithful work of the men who remain." At that time only a very small number of women were working as conductors. The Edinburgh Tramways Company seem to have been the first to experiment with them, the work being done at first by independent women as a form of patriotic endeavour. That was about the third week in February, 1915, and in March the general manager at Glasgow reported that many of the men were working seven days a week. Subsequently a deputation from the Women's National Aid Corps suggested that women should be employed as conductors at the same wages and on the same conditions as men. A week later the Glasgow Corporation Tramways had begun an experiment on those lines, and before the end of April, 1915, that example was being followed at Newcastle-on-Tyne, Salford, and other places. Thenceforward the movement spread until it has now embraced nearly every tramway undertaking in Great Britain, to say nothing of motor omnibus companies and railways.

It is largely due to the work of the women that tramways have been able not only to continue a surprisingly full list of services, but in the great centres to transport a vast and increasing army of munition workers. Nor are the services of women restricted to the duties of conductors. Several hundreds are working as cleaners, while at Glasgow the number acting as drivers will reach two hundred before the winter arrives. Up to the beginning of August 8,768 women conductors and 189 women drivers were employed by municipal undertakings, the latter numbering 150 at Glasgow, 16 at Ayr, eight at Cardiff, six at Doncaster, six at York, and three at Blackburn. In addition there are 1,205 women employed in other capacities, not including clerical work.

Corporation Employees.

Corporation.	No. enlisted.	Per cent. of total No.
Aberdare U.D.C.	40	82
Aberdeen	166	64·5
Accrington	48	48
Ashton-under-Lyne	45	55
Ayr	51	68
Barking Town U.D.C.	6	22
Belfast	273	27·5
Bexley U.D.C.	24	26
Birkenhead	67	33
Birmingham	1,407	44
Blackburn	150	50
Blackpool	65	35
Bolton	160	34
Bournemouth	247	53·78
Bradford	542	40
Brighton	208	91
Burnley	273	72·80
Burton-on-Trent	35	40
Bury	112	43
Cardiff	277	36
Chester	24	44
Chesterfield	41	30
Colchester	56	81
Colne	18	36
Coventry	96	34
Croydon	195	51
Darlington	44	63
Darwen	30	48
Derby	92	37
Doncaster	70	55
Dover	26	43
Dundee	132	50
East Ham	103	38·3
(a) Erith U.D.C.	5	8·33
Glasgow	2,809	45·78
Gloucester	44	36
Great Yarmouth	79	53
Halifax	151	53
Haslingden	2	—
Heywood	1	—
Huddersfield	155	34
Hull	271	41·7
(b) Ilford U.D.C.	32	25
Ilkeston	14	30
Ipswich	61	33
Keighley	21	36
Kilmarnock	22	50
Kirkcaldy	20	33·3
Lancaster	10	25
Leeds	790	40
Leicester	501	50
Leith	61	47
Leyton U.D.C.	179	51
Lincoln	7	21
Liverpool	2,000	75
London County Council	2,847	22
Lowestoft	37	70
Maidstone	41	71
Manchester	2,294	44·08
Nelson	24	60
Newcastle	481	44
Newport, Mon.	90	41
Northampton	56	43
Nottingham	284	40
Oldham	260	59
Pontypridd	40	53·3
Portsmouth	280	50·45
Preston	120	48
Rawtenstall	33	28·5
Reading	123	62
Rochdale	112	42
Rotherham	60	36·8
Salford	547	46
Sheffield	480	28
Southampton	140	40
Southend-on-Sea	84	45
Southport	47	55
South Shields	76	60
Stalybridge	111	48·26
Stockport	95	40
Sunderland	121	43
Swindon	18	46·5
Wallasey	127	51
Walsall	50	33·33
Walthamstow	57	46
Warrington	34	40·5
West Ham	373	49·6
West Hartlepool	33	45
Wigan	70	29
Wolverhampton	88	40
York	44	37
	22,135	

(a) 75 per cent. of the men have left to join the local munition works.
(b) 23 men have left to work at munitions.

Company Employees.

Company.	No. enlisted.	Per cent. of total No.
Aberdeen, Suburban	24	75
Airdrie and Coatbridge	14	23
Barnsley	52	43
Barrow-in-Furness	29	23
Bath	184	60·5
Bideford, Westward Ho!	10	35
Birmingham District	49	26
Blackpool, St. Anne's, and Lytham	115	76
Brighton Beach	8	50
Camborne and Redruth	5	34
Chatham and District	140	60
Cheltenham and District	60	70
Cork Electric	82	27
Dewsbury and Ossett	18	70
Dublin and Lucan	6	16
Dublin United	141	8·9
Dudley and Stourbridge	48	22
Dumbarton	25	25
Dunfermline and District	50	70
Falkirk and District	42	70
Gateshead and District	61	40
Giant's Causeway and Portrush	17	60
Glossop	15	50
Gosport and Fareham	64	61
Gravesend and Northfleet	22	25
Great Grimsby	66	40
Greenock and Port Glasgow	52	23
Guernsey	26	30
Hastings	126	50
Isle of Thanet	66	24
Jarrow and District	14	46·66
Kidderminster	24	40
Lancashire United	150	30
Liverpool Overhead	60	17
London United	730	48·53
Luton	9	51
Mansfield and District	14	45
Manx Electric Railway	48	48
Merthyr	32	28
Metropolitan Electric	684	35·48
Mexborough and Swinton	25	110
Middlesbrough, Stockton, and Thornaby	389	126
Middleton	32	36
Musselburgh	20	60
New St. Helens	81	41
Norwich	163	81
Nottingham-hire and Derbyshire	10	7
Oldham, Ashton, and Hyde	44	26
Paisley District	130	60
Peterborough	10	16
Plymouth, Stonehouse, and Devonport	16	45
Portsdown and Horndean	25	48
Potteries	180	23
Rhondda	160	50
Rothesay	11	12
Scarborough	23	50
Sheerness	6	40
South Metropolitan	120	52·5
Southport	27	40
South Staffordshire	57	35
Sunderland District	96	75
Swansea	86	30
Taunton	10	50
Torquay	102	91
Tynemouth	22	45
Tyneside	39	36·5
Wemyss	30	50
Weston-super-Mare	32	45
Wolverhampton District	22	23
Worcester	27	50
Wrexham and District	56	70
Yorkshire (West Riding)	125	40
Yorkshire (Woollen District)	81	27·93
	5,679	

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MEN WHO GAVE THEMSELVES FOR THEIR COUNTRY.

The names of tramway employees who had made the great sacrifice for their country were published in our issue of May 13, 1915. The following list records the names of many others who have since fallen. They include only those who were in the service of municipal tramways, and even as regards these the list is not wholly complete. In a later issue the names of others not now ascertained will be given, as well as of many who went from the tramway companies. Lengthy as is the roll, it is destined to increase before peace again smiles upon three continents torn by war. The end of these men will stir feelings of pride rather than grief. Innumerable letters from those in the trenches and at sea received by their relatives have shown that Britain's citizen soldiers, as well as her magnificent bluejackets, have no fear for themselves; their whole anxiety is for those they have left behind. While honouring the memory of the departed patriots, the country has not forgotten the claims of their families and dependants; and their former employers have not been slow to express their sympathy and to manifest such marks of care as can only be offered by those who were locally associated with them.

TRAMWAYMEN'S ROLL OF HONOUR.

Corporation.	Name.	Designation.	Cause of Death.
Aberdeen	C. M. Morrison	Inspector	Killed in action.
	D. Jamieson	Motorman	Died in Germany.
	A. Coutts	Motorman	Died in France.
	R. Murdoch	Motorman	Died of pneumonia.
	G. Rae	Repairer	Died of fever.
Accrington	J. M. Fawcett	Motorman	Killed in action.
Ayr	H. Clark	Motorman	Killed in action.
	H. Jones	Conductor	,, ,,
Belfast	T. M'Keavney	Motorman	Killed in action.
	W. L. M'Pherson	Motorman	,, ,,
	J. Ardis	Conductor	,, ,,
	D. M'Keown	Conductor	,, ,,
	W. Cummins	Skilled Labourer	,, ,,
	J. Bell	Skilled Labourer	,, ,,
Birkenhead	W. G. Hoskins	Car Washer	Killed in action.
	C. Richardson	Conductor	,, ,,
	G. W. Blackburn	Conductor	,, ,,
	J. Woodcock	Point Attendant	,, ,,
	D. Sharp	Clerical Staff	,, ,,
Birmingham	E. Blackwell	Conductor	Killed in action.
	W. E. Browning	Motorman	,, ,,
	H. Bignell	Conductor	,, ,,
	G. Bell	Conductor	,, ,,
	W. Bolton	Conductor	Died of wounds.
	H. Brice	Permanent Way	Killed in action.
	B. E. Clark	Conductor	Died of wounds.
	J. H. Frampton	Shedman	Died from gas poisoning.
	R. Gorman	Conductor	Killed in action.
	T. H. Hirst	Motorman	,, ,,
	H. Hill	Conductor	,, ,,
	W. R. Lee	Conductor	,, ,,
	C. H. Morgan	Conductor	,, ,,
	J. Manning	Conductor	,, ,,
	H. Mills	Conductor	,, ,,
	F. O'Dell	Conductor	,, ,,
	R. Puffett	Motorman	,, ,,
	A. Phillips	Conductor	,, ,,
	A. Parkes	Motorman	Died of wounds.
	W. H. Parkes	Permanent Way	Killed in action.
	T. Rafferty	Motorman	,, ,,
	F. H. W. Rose	Permanent Way	,, ,,
	J. T. Smith	Conductor	Died of wounds.
	A. Steenton	Shedman	Killed in action.
	E. A. Tovey	Conductor	Lost with the "Royal Edward."
	B. Walker	Motorman	Killed in action.
	W. Ward	Motorman	,, ,,
	W. Williams	Conductor	,, ,,
	F. Wilkinson	Conductor	,, ,,
	W. Alderwick	Shedman	,, ,,
	R. R. Burlison	Motorman	,, ,,
	C. Bonnard	Motorman	,, ,,
	W. J. Bottomley	Conductor	,, ,,
	F. Cooley	Permanent Way	,, ,,
	A. G. Davis	Conductor	,, ,,
	A. J. Ellesmere	Motorman	,, ,,
	A. Fancote	Brakesman	,, ,,
	J. H. H. Holmes	Conductor	,, ,,
	W. Hobday	Shedman	,, ,,
	W. C. Lowe	Motorman	Died of wounds.
	A. E. Rogers	Shedman	Killed in action.
	A. Thomas	Permanent Way	,, ,,
	A. Taylor	Car Cleaner	Died on service.
	T. Lewis	Conductor	Killed in action.
	F. Jackson	Permanent Way	,, ,,
	A. E. Sharratt	Car Cleaner	Died of wounds.
	G. Lowe	Conductor	,, ,,
	W. Fiveash	Conductor	Killed in action.
	H. Clark	Overhead	Died of wounds.
	A. Burrows	Motorman	Killed in action.
	T. Cotterill	Permanent Way	,, ,,
	R. A. Lawley	Conductor	,, ,,
	W. J. Breeze	Permanent Way	,, ,,
	E. E. Maley	Conductor	,, ,,
	A. Cox	Conductor	Died of wounds.
	H. Bass	Conductor	,, ,,
	A. A. Plant	Conductor	Killed in action.
	D. Farrell	Conductor	,, ,,
	H. Mavity	Conductor	,, ,,
	G. Powell	Pointsman	,, ,,
	T. Peach	Conductor	,, ,,
	R. F. L. Browning	Conductor	,, ,,
	A. W. Knighton	Conductor	,, ,,
	W. Russell	Car Cleaner	,, ,,
	P. A. Davies	Conductor	,, ,,
	R. Smith	Permanent Way	,, ,,
	W. B. Curry	Car Cleaner	,, ,,
	G. Snape	Overhead	,, ,,
	W. Newbold	Conductor	,, ,,
	F. Austin	Conductor	,, ,,
	C. H. Downard	Motorman	,, ,,
Bolton	John Leach	Motorman	Killed in action.
	Joseph Simmons	Motorman	,, ,,
	Herbert Shanley	Conductor	,, ,,
	Edward Mee	Clerk	,, ,,
Bournemouth	R. W. Tarrant	Permanent Way	Killed in action.
	R. Fendley	Permanent Way	,, ,,
	H. Smith	Conductor	,, ,,
	W. G. Taylor	Conductor	,, ,,
	C. Jones	Conductor	,, ,,
	C. Beven	Motorman	,, ,,
Brighton	—. Summersby	Motorman	Killed in action.
	—. Bean	Conductor	,, ,,
	—. Cooper	Conductor	Accidentally killed.
Burnley	J. Bradburn	Driver	Died of wounds.
	W. A. Brierley	Conductor	Killed in action.
	O. Ingham	Conductor	,, ,,
	F. McKenna	Conductor	,, ,,
	J. Riding	Driver	,, ,,
	R. Wood	Driver	,, ,,
Bury	H. Tennant	Motorman	Killed in action.
	D. Dickie	Motorman	,, ,,
	S. Bracewell	Motorman	,, ,,
	J. Orrell	Motorman	,, ,,
	G. V. Ash	Chief Clerk	,, ,,
	J. Scowcroft	Labourer	,, ,,
Cardiff	A. Davies	Driver	Killed in action.
	W. Gadd	Driver	,, ,,
	R. Francis	Driver	,, ,,
	J. W. Smith	Conductor	,, ,,
	D. McCarthy	Conductor	,, ,,
	G. Power	Conductor	,, ,,
	A. Thomas	Conductor	,, ,,
Chesterfield	W. H. Mellors	...	Killed in action.
	W. Wheatley	...	,, ,,
	R. Ellis	...	,, ,,
	J. Adlington	...	,, ,,
Coventry	H. J. Rottenbury	Motorman	Died on service.
	F. Swingler	Clerk	Killed in action.
	W. Humphries	Car Greaser	,, ,,
Croydon	J. J. McNamara	Conductor	Killed in action.
	W. Rudkin	Conductor	,, ,,
	G. Wilkinson	Point Lad	,, ,,
	H. Blundell	Controller Cleaner	,, ,,
	J. E. Kurn	Motorman	Died in India.
Derby	R. W. Annison	Motorman	Killed in action.
	G. Collins	Conductor	,, ,,
	C. Kerry	Conductor	,, ,,
	C. Saysell	Conductor	,, ,,
	J. H. Sims	Car Cleaner	,, ,,
Dover	R. Brann	Conductor	Killed in action.
Dundee	Alexander Brown	Motorman	Killed in action.
	James Mathers	Motorman	,, ,,
	James G. Craig	Cleaner	,, ,,
	James Taylor	Cleaner	,, ,,
	Charles Smith	Cleaner	,, ,,
	John Weir	Conductor	,, ,,
	James Petrie	Conductor	,, ,,
East Ham	W. Dyer	Motorman	Killed in action.
	R. Chittock	Pointsman	,, ,,
Gloucester	W. Fisher	Cleaner	Killed in action.
	H. Gibbons	Conductor	,, ,,
	W. Coldrick	Depot Labourer	,, ,,
	C. Aston	Motorman	,, ,,
Great Yarmouth	James Mulliner	Conductor	Killed in action.
	J. Bass	Conductor	,, ,,
Halifax	Charles McCusker	Motorman	Killed in action.
	John Little	Motorman	,, ,,
	Harry Tiley	Motorman	,, ,,
	Fred. Beaumont	Motorman	,, ,,
	Robert Ingham	Conductor	,, ,,
	Ephraim Atkinson	Conductor	,, ,,
	Thomas Boyd	Conductor	,, ,,
	Harold Iredale	Conductor	,, ,,
	Clarence Walker	Conductor	,, ,,
	Fred Ogden	Conductor	,, ,,
Huddersfield	James Slater	Car Cleaner	Killed in action.
	Claude McVeagh	Conductor	,, ,,

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ROLL OF HONOUR—*continued.*

Corporation.	Name.	Designation.	Cause of Death.
HULL	A. Donaldson	Conductor	Killed in action.
	John Reader	Conductor	" "
ILFORD	R. Armour	Conductor	Killed in action.
	—. Gander	Conductor	" "
	—. Hawkes	Conductor	" "
	T. J. Cole	Motorman	" "
IPSWICH	E. Bloomfield	Conductor	Killed in action.
	W. G. Bird	Conductor	" "
	G. Filby	Conductor	" "
	E. Chamberlain	Car Cleaner	" "
KILMARNOCK	Samuel Bole	...	Killed in action.
	James Connel	...	" "
	William Cummings	...	" "
	John Rennie	...	" "
LEEDS	J. Clarke	Conductor	Killed in action.
	E. H. Potter	Conductor	" "
	L. Taylor	Works Staff	Drowned whilst training.
	T. Ashforth	Motorman	Killed in action.
	R. Wilson	Clerk	" "
	J. H. Flintham	Conductor	" "
	G. W. Fowler	Conductor	" "
	G. Shepherd	Conductor	Drowned on transport.
	R. Dalby	Inspector	Killed in action.
	C. Ratcliffe	Conductor	" "
	H. V. Lumb	Clerk	Died from poisoning.
	C. Taylor	Conductor	Killed in action.
	G. Coultate	Permanent Way	" "
	F. Dawes	Motorman	" "
	J. Stephenson	Conductor	" "
	W. Gooch	Conductor	" "
	G. F. Easy	Motorman	" "
	H. Rhodes	Works Staff	" "
	L. H. Kirk	Conductor	Died of wounds.
	J. H. Williamson	Motorman	Killed in action.
	J. Kendall	Motorman	Died of wounds.
	A. Ager	Conductor	Killed in action.
	S. Chafer	Conductor	" "
	S. Grant	Works Staff	" "
	T. W. Troughton	Works Staff	Died of wounds.
LEICESTER	G. F. Cook	Motorman	Killed in action.
	F. Upton	Conductor	" "
	H. Hornsey	Labourer	" "
	H. Graves	Motorman	" "
	F. Freeman	Conductor	" "
	H. Makepeace	Painter	" "
	S. Riley	Bodymaker	" "
	S. Bustin	Greaser	" "
	W. Renwick	Clerk	" "
	N. Booth	Motorman	" "
	W. Birch	Motorman	" "
LEYTON	G. Aly	Conductor	Killed in action.
	G. Davis	Car Cleaner	" "
	C. F. Edney	Clerk	" "
	H. J. H. McPherson	Labourer	" "
	F. Newhouse	Car Cleaner	" "
	B. Smith	Motorman	" "
	W. Wyborn	Motorman	" "
LIVERPOOL	T. H. Corley	Office Staff	Killed in action.
	J. Evans	Conductor	" "
	M. McGuinn	Driver	" "
	F. Metcalfe	Shedman	" "
	J. Moss	Conductor	" "
	J. E. Booth	Assistant	" "
	J. G. W. V. Harris	Fitter	" "
	F. C. Jones	Shed Assistant	" "
	J. H. Livingstone	Shed Assistant	" "
	T. Walsh	Driver	" "
	F. H. Joynson	Shed Attendant	" "
	W. J. Kayll	Driver	" "
	S. Abrahams	Driver	" "
	A. Jamieson	Conductor	" "
	J. Moorhouse	Shed Attendant	" "
	H. A. R. Spencer	Driver	" "
	J. J. Smith	Conductor	" "
	J. G. Mason	Conductor	" "
	C. H. Housden	Office Staff	" "
	T. Odgers	Conductor	" "
	E. Lawrence	Conductor	" "
	J. J. Kelly	Driver	" "
	P. O'Brien	Shed Attendant	" "
	R. O. Thomas	Driver	" "
	W. Usherwood	Conductor	" "
	T. Wadman	Office Staff	" "
	E. C. Reilly	Driver	" "
	F. Cregeen	Conductor	" "
	R. Greaves	Shed Attendant	" "
	R. Jones	Conductor	" "
	W. E. Jones	Driver	" "
	G. A. Johnson	Works Assistant	" "
	J. Neville	Driver	" "
	J. H. Hull	Conductor	" "
LONDON	J. T. Pascoe	Ticket Inspector	Died of wounds.
	I. G. Everett	Car Washer	Killed in action.
	G. Hood	Permanent Way	" "
	W. G. Dickens	Permanent Way	" "
	J. Gray	Car Washer	" "
	G. Guyver	Car Washer	" "
	C. W. H. Juniper	Point Adjuster	" "
	J. J. Shrimpton	Switchboard Att.	" "
	H. J. Lock	Conductor	" "
	A. Forse	Motorman	Died of wounds.
	G. Moore	Motorman	Killed in action.
	Geo. Cox	Car Washer	" "
	Geo. Klein	Car Washer	" "
	A. J. Shepherd	Conductor	" "
	T. S. Waterhouse	Conductor	" "
	W. A. V. Luckhurst	Asst. Conductor	" "
	J. Aubury	Improver	" "
	A. Bickmore	Clerk	" "
	J. H. Rowe	Clerk	Died of wounds
	S. Clark	Conductor	" "

Corporation.	Name.	Designation.	Cause of Death.
LONDON (*continued*)	W. Allan	Cable-hand	Died of wounds.
	J. Tott	Conduit Cleaner	Killed in action.
	W. Everitt	Motorman	" "
	F. Rushton	Motorman	" "
	A. Herriott	Clerk	" "
	W. H. Ferry	Labourer	" "
	W. Allison	Car Washer	Died of wounds.
	S. W. Jones	Youth	" "
	J. E. Matthews	Conductor	Killed in action.
	H. Gostling	Labourer	" "
	J. Walker	Pointsman	Died of wounds.
	W. Wilson	Motorman	Killed in action.
	C. J. Dawes	Motorman	Died in hospital.
	H. J. Simons	Conductor	Died of wounds.
	H. Marsh	Warehouse Clerk	Killed in action.
	A. S. Plumb	Car Washer	Died of wounds.
	S. J. Baker	Controller Cleaner	" "
	A. J. King	Labourer	Killed in action.
	W. J. Fillee	Car Washer	Died of wounds.
	H. E. Cannard	Labourer	Killed in action.
	J. G. Jones	Shunter	" "
	A. E. Coventry	Conductor	" "
	H. J. R. Marson	Permanent Staff	Died of dysentery.
	S. H. Townsend	Conduit Cleaner	Killed in action.
	H. Fuller	Conductor	Died of wounds.
	A. Olney	Labourer	Lost with the "Royal Edward."
	J. R. Marshall	Motorman	Died of wounds.
	W. W. Davis	Motorman	Killed in action.
	E. Moore	Motorman	Died from hæmorrhage.
	M. Dacey	Motorman	Died from pneumonia.
	W. S. Richardson	Conductor	Died from valvular disease of the heart.
	J. Skeggs	Conductor	Died of wounds.
	H. White	Conductor	Killed in action.
	A. Cooper	Labourer	Died of wounds.
	I. G. J. Waite	Labourer	Killed in action.
	S. A. Parkington	Labourer	" "
	A. Bolt	Cable-hand	Lost his life at sea.
	F. Ashby	Conductor	Died of wounds.
	J. A. Braybrooke	Labourer	" "
	G. E. Rolfe	Labourer	" "
	G. Wright	Hammerman	Killed in action.
	C. J. Andrews	Fitter	Died from peritonitis.
	C. Hodgkinson	Lt. & Power Attd.	Died of wounds.
	H. M. F. Quick	Motorman	Killed in action.
	J. Smythe	Regulator	" "
	W. A. Butlin	Car Washer	" "
	A. W. Roberts	Labourer	Died of wounds.
	M. Cutler	Conductor	Killed in action.
	J. Cromarty	Labourer	Died of suffocation.
	E. Kirby	Conductor	Died of wounds.
	E. W. Whitlock	Motorman	Lost in the "Queen Mary."
	E. C. Laver	Conductor	Died of wounds.
	W. C. Haward	Motorman	Accidently drowned.
	F. Pearce	Motorman	Killed in action.
	M. Humphrey	Conductor	Died of wounds.
	H. A. Cole	Fitter	" "
	W. C. Rice	Youth	Killed in action.
LOWESTOFT	. Stannard	Motorman	Killed in action.
	. Freestone	Conductor	" "
MANCHESTER	A. E. Smith	Guard	
	H. Thorp	Guard	
	M. Kerrigan	Labourer	
	I. R. H. Heseltine	Trolley Boy	
	J. F. Parsonage	Trolley Boy	
	J. Craven	Brakesman	
	W. E. Kerridge	Guard	
	W. T. Horrocks	Driver	
	H. Haynes	Trolley Boy	
	J. Barrett	Driver	
	A. Davies	Trolley Boy	
	S. Pickford	Van Driver	
	A. Upton	Handyman	
	J. Gorman	Guard	
	W. Burns	Guard	
	T. Brownhill	Guard	
	W. Heald	Guard	
	C. Stubbs	Driver	
	W. H. Wadham	Guard	
	J. R. Groom	Guard	
	A. Rounsevell	Driver	
	J. Powell	Brakesman	
	R. Longshaw	Driver	
	B. J. Butler	Brakesman	
	E. H. Furnival	Washer	
	A. McCluskey	Guard	
	T. Barton	Driver	
	R. Naylor	Fitter	Killed in action or died of wounds.
	W. Walker	Trolley Boy	
	W. Sanderson	Car Cleaner	
	I. G. Macdonald	Driver	
	E. Bloor	Trolley Boy	
	W. McDonald	Guard	
	I. Ogden	Pavior	
	W. Whettall	Driver	
	F. Smethurst	Driver	
	P. Horner	Labourer	
	G. C. Bouchier	Trolley Boy	
	T. Conway	Handyman	
	H. Greenfield	Guard	
	T. E. Hughes	Car Cleaner	
	W. H. Hamilton	Guard	
	E. Hayes	Guard	
	W. Cain	Guard	
	L. Boddows	Guard	
	G. F. Newman	Trolley Boy	
	I. Nicholson	Driver	
	W. Renshaw	Trolley Boy	
	T. Dunn	Trolley Boy	
	T. Rae	Trolley Boy	
	R. Hudson	Trolley Boy	
	W. M. Pinkerton	Trolley Boy	
	A. Corner	Handyman	
	H. Walton	Trolley Boy	

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ROLL OF HONOUR—*continued.*

Corporation.	Name.	Designation.	Cause of Death.
MANCHESTER (*continued*)	B. Matthews	Guard	
	M. Joyce	Cleaner	
	W. Davies	Bodymaker	
	J. Nicholson	Driver	
	W. Kenny	Guard	
	T. Wootton	Guard	
	J. Moran	Labourer	
	D. Paton	Trolley Boy	
	L. S. Lloyd	Trolley Boy	
	E. Valentine	Car Cleaner	
	F. Moffatt	Trolley Boy	
	O. J. Glancy	Platelayer	
	R. Sharpley	Guard	
	J. C. Oley	Driver	
	W. Penny	Pavior	
	R. Cooper	Guard	
	F. T. Lever	Guard	
	S. M. Bleasdale	Driver	Killed in action or died of wounds.
	T. Thorneycroft	Rubber (Works)	
	G. Lewis	Trolley Boy	
	A. T. Westmacott	Cleaner	
	S. Burgess	Boilerman	
	J. W. Forghan	Cleaner	
	J. R. Wroe	Guard	
	F. Dent	Car Cleaner	
	F. Male	Apprentice Painter	
	J. Irlam	Guard	
	J. Kirkpatrick	Trolley Boy	
	G. Rastall	Driver	
	S. Williams	Trolley Boy	
	J. Nicholson	Driver	
	P. C. Swift	Trolley Boy	
	A. Rippon	Bodymaker	
	A. Cornthwaite	Brakesman	
	R. S. Thompson	Cleaner	
	W. Rothwell	Handyman	Drowned.
	G. E. Broom	Clerk	Died from dysentery.
	H. Hallworth	Trolley Boy	Died while training.
	P. W. Longshaw	Driver	Killed in action.
	H. R. Ringer	Driver	,, ,,
	E. Fitton	Driver	,, ,,
	C. O'Connor	Driver	,, ,,
	T. Wingrave	Labourer	,, ,,
NEWCASTLE	N. Ross	Motorman	Killed in action.
	T. Nesbitt	Motorman	,, ,,
	S. Cooper	Motorman	,, ,,
	J. Bell	Conductor	,, ,,
	F. Brown	Motorman	,, ,,
	S. Webb	Motorman	,, ,,
	R. Nealings	Motorman	,, ,,
	F. W. Robinson	Motorman	Died of wounds.
NOTTINGHAM	T. Duffin	Conductor	Killed in action.
	L. Andrews	Conductor	,, ,,
	R. Slater	Conductor	,, ,,
	H. Tutin	Conductor	,, ,,
	W. Cunnadine	Motorman	,, ,,
	A. Lymn	Labourer	,, ,,
OLDHAM	Harry Slinger	Conductor	Killed in action.
	John Lowe Taylor	Conductor	,, ,,
	John Wright Wood	Conductor	,, ,,
	Harold Shaw	Conductor	,, ,,
	Alfred Dale	Conductor	,, ,,
	Edward Custy	Conductor	,, ,,
	John Cartledge	Way Labourer	,, ,,
	John William Rose	Way Labourer	,, ,,
	Sidney Crawshaw	Junior Clerk	,, ,,
	James Wilson	Conductor	,, ,,
PORTSMOUTH	A. C. Taplin	Conductor	Drowned on H.M.S. "Good Hope."
	Chas. Parks	Conductor	,, ,, ,,
	E. B. Green	Conductor	Died of consumption.
	John Nolan	Conductor	Died of wounds.
	George Cook	Conductor	,, ,,
	—. Cornhill	Conductor	Died of pneumonia.
READING	L. Gibbons	Conductor	Killed in action.
	W. L. Streake	Conductor	Died of enteric fever.
ROCHDALE	A. Swaine	Conductor	Killed in action.
	J. W. Boothman	Motorman	Died of wounds.
	H. Hardiker	Motorman	,, ,,
	J. Fitton	Labourer	Killed in action.
	A. E. Riley	Conductor	Died of wounds.
SALFORD	F. Anderton	Motorman	Killed in action or died.
	F. Rogers	Motorman	
	J. Hancock	Motorman	
	H. Hessey	Motorman	
	B. Devine	Motorman	
	A. Platt	Motorman	
	P. Whatmough	Motorman	
	C. K. Tomlinson	Motorman	
	W. Corbett	Conductor	
	J. Taylor	Conductor	
	G. Hall	Conductor	
	G. A. Ong	Conductor	
	J. Dickson	Conductor	
	W. H. Watson	Conductor	
	A. Stewart	Conductor	
	H. Mutch	Night Staff	
	H. C. Darbyshire	Office Staff	
	W. Johnson	Youth	
	J. Fender	Youth	
	L. A. Wilson	Youth	

Corporation.	Name.	Designation.	Cause of Death.
SHEFFIELD	R. Ketterick	Motorman	Killed in action or missing.
	H. Bates	Motorman	
	J. E. Colton	Motorman	
	F. Evans	Motorman	
	G. Shannon	Motorman	
	C. Wagstaffe	Motorman	
	J. Holmes	Motorman	
	J. Morley	Motorman	
	J. Hawtin	Motorman	
	R. Briggs	Motorman	
	J. W. Powell	Conductor	
	A. Dawson	Conductor	
	J. W. Holmes	Conductor	
	J. S. Glanville	Conductor	
	E. Barlow	Conductor	
	T. J. Morrisey	Conductor	
	B. Wright	Conductor	
	W. Marsden	Conductor	
	P. Dallyn	Conductor	
	G. J. Warneford	Conductor	
	J. L. Hall	Joiner	
	W. E. Turner	Cleaner	
	H. Rowbotham	Shedman	
	E. Donhue	Apprentice	
SOUTHAMPTON	John Cox	Motorman	Killed in naval action.
	H. L. Warwick	Motorman	Died of wounds.
	—. Webb	Blacksmith	Died in hospital.
	—. Richards	Fitter's Mate	Killed in action.
	—. Page	Conductor	,, ,,
	—. Merritt	Car Cleaner	,, ,,
SOUTHPORT	Eric Sucksmith		Killed in action.
STALYBRIDGE, HYDE, MOSSLEY, AND DUKINFIELD	J. Shaw	Motorman	Killed in action.
	H. Mather	Motorman	,, ,,
	A. Wright	Conductor	,, ,,
	E. Hadfield	Conductor	,, ,,
	H. Shaw	Conductor	,, ,,
	H. Smith	Conductor	,, ,,
SUNDERLAND	E. Read	Motorman	Killed in action.
SWINDON	J. W. Law	Conductor	Killed in action.
	A. Wright	Conductor	,, ,,
WALLASEY	M. Doyle	Driver	Killed in action.
	R. Corfield	Driver	,, ,,
	J. H. Dean	Driver	,, ,,
	H. Laurence	Conductor	,, ,,
	W. Thompson	Conductor	,, ,,
	G. Taker	Shedman	,, ,,
	L. Hughes	Shedman	,, ,,
WALSALL	G. Allsopp	Motorman	Died of fever.
	S. Rider	Motorman	Died of wounds.
	R. Poole	Shed Staff	Killed in action.
WALTHAMSTOW	James Grey	Motorman	Killed in action.
	A. J. Wicks	Conductor	,, ,,
WEST HAM	J. Underwood	Conductor	Killed in action.
	F. W. Gould	Shed Labourer	,, ,,
	F. Knight	Track Examiner	,, ,,
	W. J. Coker	Motorman	,, ,,
WEST HARTLEPOOL	T. Buttery	Motorman	Killed in action.
	J. Mawhinney	Motorman	,, ,,
WIGAN	Miles J. Smith	Conductor	Died in France.
	Thomas Graham	Motorman	Killed in action.
	Joseph Vernon	Coach Pntr. Appr.	,, ,,
WOLVERHAMPTON	F. Bolland	Conductor	Died in hospital.
	F. Knipe	Conductor	Killed in action.
	H. Walker	Cleaner	,, ,,
YORK	G. Britton	Motorman	Killed in action.
	R. H. Cairns	Conductor	,, ,,
	W. Ireland	Conductor	,, ,,
	H. Lawson	Conductor	,, ,,
	F. C. White	Conductor	Died of fever in Germany.
BRADFORD	R. Raw	Conductor	Killed in action.
	A. Simpson	Conductor	
	H. Neale	Conductor	
	B. Conboy	Conductor	
	W. S. Marshall	Driver	
	R. Helliwell	Parcel Messenger	
	C. Pape	Clerk	
	J. Holdsworth	Parcel Messenger	
	H. Holland	Conductor	
	R. B. Hargrave	Driver	
	A. Barker	Parcel Messenger	
	P. Smith	Parcel Clerk	

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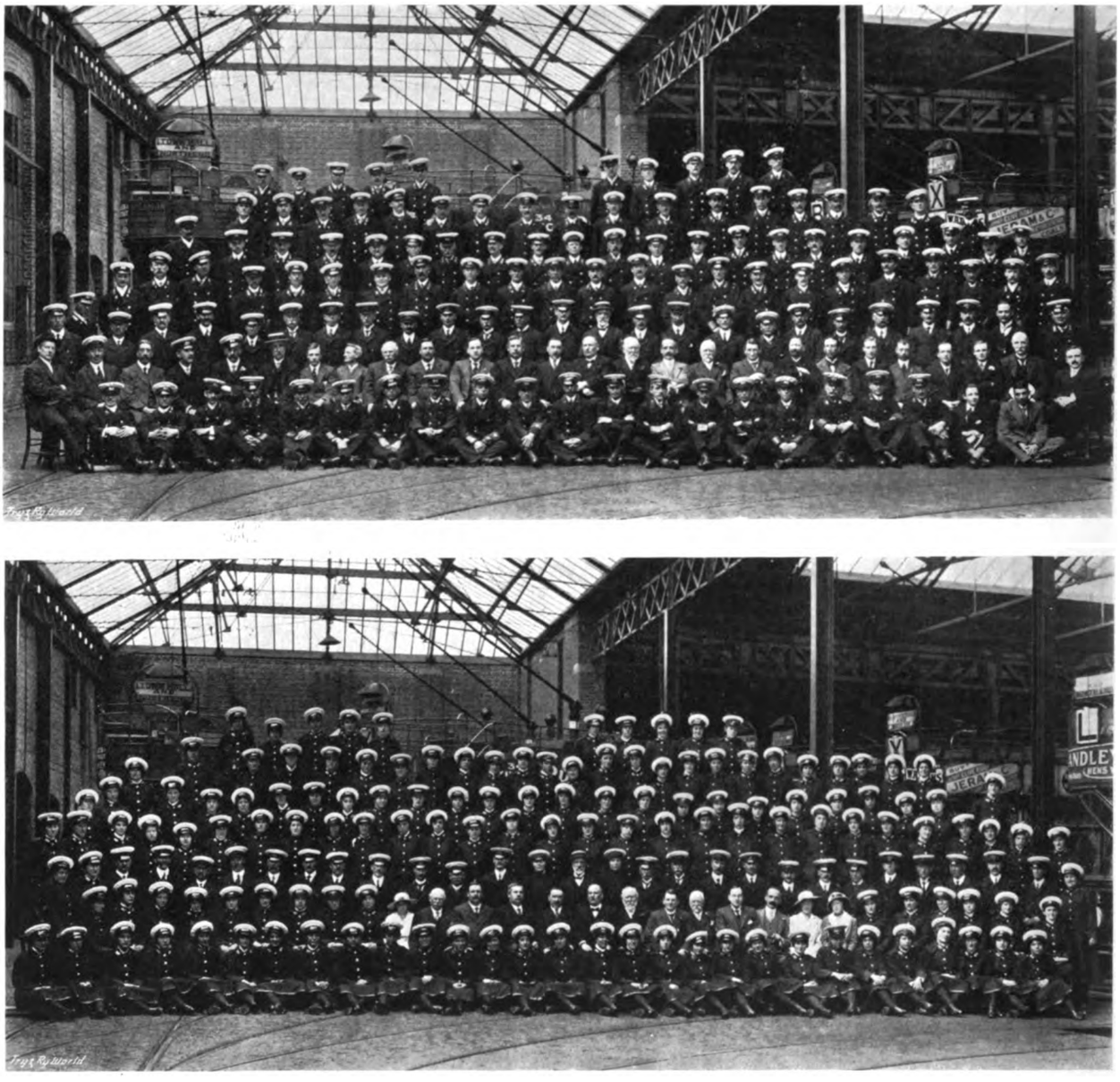
A NOTABLE YEAR AT PORTSMOUTH.

The Portsmouth Tramways Committee, Mr. W. R. Spaven, the general manager, and Mr. V. G. Lironi, the electrical and permanent way engineer and rolling stock superintendent, merit the thanks and congratulations of the Town Council and the ratepayers. The electric tramways were opened in September, 1901, and the results both as regards finance and public service have realised the expectations that were entertained when the Corporation purchased the undertaking. Yet although the fifteenth anniversary is close at hand there is no indication that the authorities have reached such a degree of satisfaction with things as they are as to prevent them from anticipating further improvements after the war. Besides possessing well-tried officials, the Corporation of the great naval centre are fortunate in their representative who fills the chair of the Tramways Committee; and it is an advantage to the continuity of their policy that Councillor J. Timpson, who was elected chairman last November, occupied the position of vice-chairman for a number of years. The committee's policy has always included an adherence to sound financial provision, thorough maintenance, and the promotion of a high standard of efficiency. Not the least important influence in this direction is the manner in which the general manager labours to promote *esprit de corps* among the employees, a matter of great difficulty during such a period as the past two years, when the majority of the men have left the service and placed their lives at the disposal of their country. To fill the gap the women of Portsmouth have rendered invaluable assistance.

One way by which the employees have been encouraged to maintain their interest in the work is the provision of new uniforms simultaneously to the entire staff. This was recently done for the first time at a cost of nearly £1,000, the contractors being Messrs. J. Cantor and Company, of Old Nichol Street, London, E. It speaks well for the contractors that not only were the whole of the uniforms delivered well in advance of the contract date, but that not one of them required to be altered in any particular, so carefully had the measurements been taken and the work executed. It was fitting that the employees on the first occasion after such an event should be given an opportunity of seeing themselves collectively. For this purpose the general manager called a parade at the North End depot before they went on duty on a recent Sunday, the arrangement meeting with the ready approval of the committee. The motormen and conductors numbered 355, and with the indoor staff the total strength was nearly 400.



Portsmouth Corporation Tramways Committee, Staff and Employees.

Before the company was dismissed to duty the parade was photographed, and the chairman expressed the committee's satisfaction with the smart appearance of the new uniforms. He also spoke of the very satisfactory manner in which the whole of the staff and employees had rendered assistance in coping with the demands of the traffic during the past two years under the many difficulties arising out of the war. Finally Councillor Timpson thanked everyone for the untiring efforts they had put forth to meet every requirement of the department, and he assured them of the committee's appreciation of their work. Brakes were provided for conveying the employees to and from the parade and to headquarters for going on duty afterwards. The women conductors' uniforms are of dark grey material edged in red.

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Other matters may be mentioned in which enterprise has been shown. The first is that a score of voluntary motormen are engaged in car driving, following careful tuition. These substitutes are rendering very valuable service. Another point is the successful working of the barrier system at North End to regulate the boarding of the cars. When peace is restored progress will be made with the plans for a modern terminal at Cosham.

As to the financial aspect of the undertaking the past year's receipts show a disposable balance of £31,345. After allowing for the usual charges, including £6,060 to renewals, a balance of £20,278 remains to be dealt with as follows:—Relief of the rates, £13,000 (equivalent to nearly a 4d. rate); reserve and insurance fund, £3,000; carry forward, £4,278. The highest sum previously allocated to the relief of the rates was £10,000. The renewals fund amounts to £67,424, and the reserve and insurance fund to £24,233. During the year important concessions were made in regard to

Mr. W. R. Spaven
(*General Manager*).

Coun. J. Timpson
(*Chairman*).

cheap tickets and section extensions, yet the total revenue of £127,546 was far in excess of any previous year. The committee and the manager deserve hearty congratulations upon achieving such a successful result in a year of unexampled difficulty.

It may be mentioned that Mr. W. R. Spaven, the general manager, recently completed thirty-eight years of tramway service. For some years he was assistant manager of Leeds tramways, taking part in the conversion of the system to electric traction, and the institution of the new and improved service. A few years later, when the Portsmouth tramways were in their turn converted to electric traction, he was appointed general manager, and he has now occupied this position for nearly fifteen years. Throughout that period the tramway department has been uniformly successful and the general manager has had the gratification of receiving many well-merited expressions of approval from his committee and the public.

FINANCIAL REPORTS AND MEETINGS.

Hadfields, Limited, have declared a dividend of 1s. per share on the ordinary shares, free of tax.

Swansea and Mumbles Railway.—An interim dividend has been declared at the rate of 9⅜ per cent. per annum on ordinary shares for the half-year.

Paisley District Tramways.—The directors have declared an interim dividend at the full rate of 5 per cent. per annum on preference shares for the half-year.

Stewarts and Lloyds, Limited.—The board announce an interim dividend at the rate of 6 per cent. per annum on the preference shares and 10 per cent. per annum on the preferred ordinary shares for the six months ended June 30.

Guest, Keen and Nettlefolds, Limited.—The directors, at the annual meeting, which took place on August 31, recommended the payment of final dividends as follows:—On preference shares at the rate of 5 per cent. per annum for the half-year ended June 30, and on ordinary shares at the rate of 10 per cent. per annum, for the half-year ended June 30, together with a bonus of one shilling per share on ordinary shares, all free of income-tax. Similar distributions to the foregoing have been made for many years.

Millars' Timber and Trading Company.—The report for 1915 states that the balance of profit, before deducting interest on debenture stock or depreciation, is £75,172, which, with £73,414 brought forward, makes £148,583. Interest on debenture stock and the amount payable to the sinking fund in lieu of interest on debenture stock cancelled amount to £21,773; there has been carried to depreciation reserve account £25,000; the dividend on preference shares for the year amounted to £51,000; leaving a balance to carry forward of £50,810.

Aberdeen Suburban Tramways Company.—The report for the half-year ended July 31 gives the profit as £1,054, while the balance to the credit of profit and loss account is £3,209. This sum has been applied as follows:—£1,200 to the renewal and depreciation account, which will then stand at £16,700; a dividend at the rate of 5 per cent. for the past year on the paid-up capital, £1,561 18s.; directors' fees, £31 10s.; leaving to be carried forward £415 14s. 3d.

L.C.C. Tramways Record Week.—For the week ended August 2 the traffic revenue for the tramways of the London County Council amounted to about £52,300. This is a record for the undertaking. During the week 729,177 children travelled by tramway at reduced fares. Advantage of these reduced fares has been taken to a greater extent since the schools were closed for the summer holidays by children going to parks, open spaces, and places of interest. A great portion of the increased receipts is due to the presence of the captured submarine minelayer at the Temple pier.

Tyneside Tramways and Tramroads Company.—In their half-yearly report the directors state that the surplus of receipts over expenses is £4,129, which, with the balance brought forward (£625), makes a total to the credit of profit and loss account of £4,755. After deducting interest on debentures, loans, etc., amounting to £1,013, there remains £3,742. This profit the directors proposed to appropriate as follows:—Dividend on the preference shares at the rate of 5 per cent. per annum, less income-tax, £601; dividend on ordinary shares at the rate of 1¾ per cent. per annum, less income-tax, £1,172; reserve for renewals, depreciation, and other contingencies, £939 (this, with £435 interest on investments, will increase the fund to £23,936); reduction of registration and formation expenses, etc., £330; leaving to be carried forward, £700. The traffic receipts show a decrease of £1,017 14s., as compared with the corresponding period of last year; due to the loss of pleasure traffic. Dr. Merz, presiding at the annual meeting on August 15, said they need not be discouraged by the reduction of the dividend, because it was largely explained by the fact that the holiday traffic had practically disappeared for the present. The ordinary traffic had been reduced by £645. There was a small increase in the workmen's traffic. The week-end traffic was now regular and larger than last year, especially in fine weather. To date the traffics had increased. On the whole they might look forward to a better time during the second half of the year. Mr. J. E. Henderson (deputy chairman) seconded, and the report was adopted. The chairman moved and Lord Armstrong seconded the payment of the dividends. A donation of £10 10s. was voted to the Royal Victoria Infirmary, and the directors were empowered to contribute £200 to charitable purposes in connection with the war.

South Shields Tramways.—Notwithstanding the difficulties caused by the war, the results of the year's work have been very satisfactory. Mr. J. C. Whiteley was appointed general manager and engineer about fifteen months ago, and the report now published covers the first year of his management. Alderman Wylie, chairman of the tramways committee, in moving the adoption of the annual report at a recent Council meeting, described the past year as a very strenuous one. The difficulties that had been met with had been almost insurmountable, but the revenue had been greater than in any previous year. The expenses had been heavier by £801, because they had paid £1,922 to make up the wages of men who had joined the colours; but working expenses were actually less. They finished the year with a surplus of £6,504, after paying interest and sinking fund charges, which he thought was very creditable. Of this amount £2,400 would go to the relief of rates and the balance to the reserve fund, which would in consequence be raised to £35,600, this being equivalent to 19·6 per cent. of the capital outlay. As they were only allowed to accumulate as a reserve an amount equal to 20 per cent. of their expenditure, they could only place another £700 to that fund. They carried people a greater distance for a penny than any other tramway undertaking, viz., 3·1 miles. These results were due to careful management and the good work of every member of the staff. A summary of the results for the past three years is appended:—

	1915-16.	1914-15.	1913-14.
Capital expenditure	£181,607	£181,097	£173,599
Loans outstanding	£148,577	£155,213	£146,912
Total track mileage	10·25	10·25	10·25
Number of cars in stock ...	40	40	35
Traffic revenue	£41,326	£39,275	£37,744
Total revenue	£41,826	£39,846	£38,331
Working expenses	£24,385	£24,864	£22,585
War allowances	£1,932	£646	—
Gross balance	£15,509	£14,336	£15,746
Net profit	£6,504	£5,594	£7,107
Passengers carried	11,163,378	10,479,421	10,005,164
Average fare per passenger ...	·8739d.	·8995d.	·9054d.
Car mileage	824,887	927,728	898,015
Units per car-mile	1·347	1·293	1·231
Power cost per car-mile ...	1·9069d.	1·7798d.	1·710d.
Traffic receipts per track mile	£4,026	£3,826	£3,677
Traffic receipts per car-mile	12·0237d.	10·1603d.	10·0873d.
Expenses per car-mile ...	7·0948d.	6·4322d.	6·0360d.
Ratio of expenses to revenue	58%	62·4%	58·92%

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Croydon Corporation Tramways.—The annual report of the general manager, Mr. T. B. Goodyer, for the year ended March 31, shows that the total receipts were £94,416. This is an increase of £5,801 over the previous year, in spite of the recent strike. Deducting working expenses, £72,509, war allowances, £4,982, and bank interest and income-tax on stock, there remains a gross balance of £18,278. Interest, sinking fund, and income-tax reduces this to a net surplus of £844, which has been carried to the renewals fund. In view of the difficulties of the past year and of the strike, which was partially continued for several weeks, the result is an excellent showing.

Aberdeen Corporation Tramways.—In moving the adoption of the accounts of the tramway committee for the year ended May 31, at the August meeting of the City Council, Councillor Robertson said the revenue showed an increase of £6,326, which was a very large one considering the number of men away from the town. Expenses were up £6,673, mainly owing to income-tax, war bonus, repairs to the track, and dependants' allowances. The profit of £9,697 was not quite so large as in the previous year. Out of that profit the Corporation had power to dispose of £3,232, and the committee recommended that £2,000 be allocated to the common good, and £1,232 in carrying out city improvements. The accumulated funds had reached £267,567, while the capital expenditure was only £368,769. Appended is a summary of the reports for three years :—

	1916-15.	1915-14.	1914-13.
Capital expenditure	£368,769	£366,332	£357,191
Amount outstanding	£201,972	£213,335	£216,711
Traffic revenue	£92,784	£86,614	£84,275
Total revenue	£94,328	£88,002	£85,266
Working expenses	£55,602	£51,525	£47,036
War allowances	£2,595	£875	—
Gross balance	£36,130	£36,477	£38,230
Income-tax	£3,275	£1,626	£983
Net profit	£9,697	£11,000	£14,062
Passengers carried	26,593,730	24,048,816	22,218,142
Fare per passenger	·83d.	·86d.	·91d.
Car mileage	1,968,615	1,909,009	1,832,587
Units per car mile	1·260	—	1·184
Power cost per car-mile ...	1·061d.	1·027d.	·956d.
Traffic receipts per track mile	£3,313	£3,121	£3,064
Traffic receipts per car-mile ...	11·31d.	10·89d.	11·04d.
Expenses per car mile ...	7·09d.	6·48d.	6·16d.
Ratio of working expenses ...	61·70%	58·54%	55·16%
Track mileage	14m. 4f.	14m. 3f.	14m. 3f.
Number of cars in stock ...	83	83	77

Dundee Corporation Tramways.—In submitting the report for the year ended May 15 to the City Council, Councillor G. A. Johnston, chairman of the tramways committee, stated that the department is in a strong position. In ten years the revenue has increased from £50,154 to £71,940, and in that time £103,642 has been contributed to the sinking fund, while to the accident, renewals, and depreciation funds there has been paid £97,894. We append a table showing the principal items in the accounts for the past three years. This shows that although having to contend with increased charges for energy and materials, besides paying more than double the sum required for war allowances and bonus in the previous year, £5,200 was added to the reserve fund, £8,188 was expended on general repairs and maintenance, an increase of £744 on 1914-15, and only £1,288 less than in the pre-war period. Car mileage increased by 27,542 miles, passengers by 873,500, and the receipts by £3,607. In August, 1915, the department took over and began working 1,514 yards of double line that previously belonged to the Dundee, Broughty Ferry and District Tramways Company, and a scale of through fares to West Ferry and Broughty Ferry was agreed to in November last.

	1915-16.	1915-14.	1914-13.
Capital expenditure	£383,486	£371,145	£362,116
Amount outstanding	£279,844	£274,383	£272,053
Reserve or renewals fund ...	£97,894	£92,694	£82,966
Traffic revenue	£70,455	£66,552	67,754
Total revenue	£71,940	£68,273	£69,504
Working expenses	£48,431	£43,358	£43,438
War allowances	£2,783	£1,116	—
Gross balance	£23,509	£24,915	£26,066
Net profit	£6,777	£8,902	£10,713
Passengers carried	19,626,640	18,753,140	19,042,344
Fare per passenger	·861d.	·851d.	·853d.
Car mileage	1,415,887	1,388,345	1,387,980
Units per car-mile	1·912	1·847	1·815
Power cost per car-mile ...	2·061d.	1·847d.	1·815d.
Receipts per mile of single track	£2,348	£2,345	£2,387
Traffic receipts per car-mile ...	11·942d.	11·504d.	11·715d.
Expenses per car-mile, excluding power	6·148d.	5·648d.	5·696d.
Ratio of working expenses ...	67·3%	63·5%	62·49%
Total track mileage	16¼m.	15⅝m.	15⅝m.
Number of cars in stock ...	76	72	68

CONTRACTS AND ORDERS.

British Insulated and Helsby Cables, Limited, have a contract from Sunderland Council for a supply of cables.

Edison and Swan Company, Limited, have a contract for the supply of metal-filament lamps to Melbourne City Council.

Aberdeen Council have placed a contract with C. A. Parsons and Company, Limited, for a 5,000 KW. turbo-generator set, at £18,000.

Peckham Truck and Engineering Company, Limited, have a contract to supply fifteen Peckham trucks to Sheffield Tramways Committee.

Bradford Tramways Committee have arranged for Messrs. Clay and Atkinson to continue to supply phosphor-bronze castings until December 31 next.

British Westinghouse Company are supplying a rotary converter to Barrow Council and a 1,000 KW. rotary converter and transformer to Salford Council.

Sheffield Electricity Committee have accepted the offer of the British Electric Transformer Company, Limited, to extend their contract for two years.

Crypto Electrical Company have an order from the Metropolitan Asylums Board for an electric motor for working tire inflators at four ambulance stations.

The Improved Wood Paving Company, Limited, are supplying 100,000 creosoted deal paving blocks to Lambeth Borough Council, at £19 11s. 9d. per 1,000 blocks.

The Midland Railway Company have again made an arrangement with Shepherd's Parging Block Company, Limited, of Milkstone, Rochdale, for the supply of their block parging.

Salford Tramways Committee have allotted a contract to J. Russell and Sons, Wednesbury, for the supply and delivery of forty tramway standards, at £12 17s. 2d. per standard.

Wolverhampton Council have placed a contract with Herbert Morris, Limited, for a 40-ton travelling crane, at £1,450, and with J. E. Perry and Son for the erection of a steel chimney, at £540.

Sunderland Tramways Committee have placed the following contracts :—Men's uniforms, H. Lotery, London ; men's overcoats, J. Cantor and Company, London ; female conductors' uniforms, Bainbridge, Newcastle ; female conductors' overcoats, H. Lotery, London.

Electrical Supplies to the War Office.—A recent list of War Department contracts includes the following :—Electric cable, Siemens Brothers and Company, Limited, and Liverpool Electric Cable Company, Limited ; electric light and power sundries and rotary converter at Woolwich, General Electric Company, Limited ; generating sets, W. H. Dorman and Company, Limited ; electric generators and motors and parts, British Thomson-Houston Company, Limited.

Aberdeen Clothing Contract.—The Tramways Committee have accepted the following tenders for the supply of employees' uniforms :—Inspectors', motormen's, conductors', and parcel boys' tunics and trousers, Anderson and Thomson, Aberdeen ; overcoats for inspectors, motormen, and conductors, Moore, Taggart and Company, Glasgow ; waterproofs for inspectors and motormen, London Rubber Company, Aberdeen ; caps, Army and Navy Stores, London.

Shepherd's Parging Block Company, Limited, have received orders for a large quantity of block parging from Coventry, Rochdale, and Gloucester Corporation Tramways, and the company's block parging has been specified for two other Corporation tramway extensions. The company ask us to point out that the block parging does not prevent bedding from being squeezed out from under the paving and up into the cavities of the tramway rail, thus letting down the sett. The block parging is a modern way of filling the space between the base and the head of the rail.

Victorian Railway Commissioners have placed the following contracts :—Cowley's Eureka Ironworks Company, mild steel masts, bridges and brackets for overhead equipment of Melbourne suburban railways ; British Insulated and Helsby Cables, Limited, three-core cable for Newport workshops, £2,865 11s. per mile ; J. Miller, acetylene welding of rail joints, Sandringham-Black Rock Railway, £1 13s. per joint ; Australian General Electric Company, electrical supplies for point indication during five years, and various equipment for Jolimont car shops and Newport signal shops ; Edison and Swan United Electric Light Company, motor generator and switchboard for Jolimont car shops.

Manchester Electricity Committee have awarded the following contracts :—Hydraulic Engineering Company, coal unloading plant (with licence to sub-let turntable to Dick, Kerr and Company, Limited) ; five 1,000 KW. transformers, Ferranti, Limited ; 250 KW. and 500 KW. transformers, Ferranti, Limited ; cable, British Insulated and Helsby Cables, Limited, and C. Macintosh and Company, Limited ; varnish, Pinchin, Johnson and Company, Limited. The following are twelve months' contracts for supplies :—Electrical accessories, General Electric Company, Limited ; incandescent and radiator lamps, British Thomson-Houston Company ; bitumen tape and linen tape, W. T. Henley's Telegraph Works Company, Limited.

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PERSONAL.

Mr. H. Evans, superintendent of tramways and ferries, Khartoum, arrived home in August on leave.

Sir Alexander B. W. Kennedy has been appointed chief engineer to the St. James's and Pall Mall Electric Light Company.

Mr. John Harris, City Sheriff of Lincoln, and secretary to Messrs. Clayton and Shuttleworth, has been added to the Commission of the Peace for Lincoln.

Mr. W. Fraser, station superintendent, Barking Council electricity department, has been appointed electrician in charge of a range of Midland shell factories.

Mr. R. B. Leach, general manager, Heywood Corporation Tramways, and borough electrical engineer, has been appointed electrical engineer for Loughborough.

Mr. W. O. Strangward, late secretary to the Prahan and Malvern Tramways Board, has been appointed secretary of the Melbourne Tramways Board, the annual salary being £1,200.

Mr. G. Lewis, who retired at the end of August from the position of an inspector to Manchester Corporation Tramways, has been continuously employed on the city tramways since 1876.

Mr. H. A. Wilcox, manager of the Melbourne Tramways and Omnibus Company, has been appointed general manager to the Tramways Board which is taking over the company's undertaking. The salary is £2,500 per annum.

Mr. Frederick Whitridge, president of the Third Avenue Electric Railroad, who was stated to be spending a vacation in England, was blamed by the public authorities of New York for the strike of tramway employees in that city. It is alleged that his company had ignored the arbitration agreement with the men.

Sir Maurice Fitzmaurice, late chief engineer to the London County Council, is chairman of the engineering committee of the Advisory Council to the Committee of the Privy Council for Scientific and Industrial Research. The Council has just issued its first annual report, which contains some important recommendations.

Mr. F. P. Dolamore, the new borough engineer of Bournemouth, has been in the service of the Corporation for twenty-five years. He became deputy borough engineer nineteen years ago, and under the late Mr. F. W. Lacey he took part in remodelling the main drainage, construction of the tramway track with necessary street widenings, and other important works.

Mr. Peter Fisher, general manager, Dundee Corporation Tramways, is the president this year of the Municipal Tramways Association. At the August meeting of the City Council Bailie Buist remarked that in ordinary circumstances the conference would have been held in Dundee instead of in London. He therefore suggested that the Lord Provost should accompany the chairman and the manager to the conference, but the suggestion was not adopted.

Mr. Arthur du Cros, M.P., who was one of the recipients of a knighthood on the occasion of the King's birthday, occupies a post at the Ministry of Munitions, where he has helped to speed up the production of motor transport and munitions. Sir Arthur is best known as the managing director of the Dunlop Rubber Company. Recently he assisted in securing for the nation Dante Gabriel Rossetti's famous collection of pictures, and is an honorary member of the National Art Collections Fund.

Dr. J. Theodore Merz, D.C.L., who presided as chairman at the annual meeting of the Tyneside Tramways and Tramroads Company, has devoted many years of his life to the organisation and promotion of scientific manufactures. The honorary degree of D.C.L. of Durham University was conferred upon him in recognition of his services in that respect. He has been closely identified with Armstrong College, and has achieved literary distinction through "A History of European Thought in the Nineteenth Century"—*Newcastle Daily Journal.*

Chief Inspecting Officer of Railways. Colonel P. G. von Donop, R.E., having retired under the age limit regulation from the position of chief inspecting officer of railways, Colonel J. W. Pringle, R.E., has been promoted to that position. Since the outbreak of the war Colonel Pringle's services had been lent to the War Office by the Board of Trade, to which department he has now returned. Colonel von Donop went to the Railway Department of the Board of Trade in July, 1899, and he became chief inspecting officer of railways when Sir Arthur Yorke retired in July, 1913.

Alderman H. W. Littler, who has been a member of the Electric Lighting and Tramways Committee of West Ham since its inception and chairman for seven years in all, resigned his position as chairman on March 21 last owing to his removal into the country. The committee expressed appreciation of his services in the following resolution, which has been published in the annual report of the department:—"In parting with their chairman, the committee place on record their very high appreciation of the excellent services rendered by him both as a member and chairman, and of the great interest which he has at all times taken in the efficient development and the successful working of the electricity and tramway undertakings."

Mr. J. Brierley, traffic superintendent, and **Mr. J. W. Thorpe,** works manager, Oldham Corporation Tramways, have received recognition from the Council of the services they rendered during the three months preceding the appointment of Mr. P. Priestly as general manager and engineer. Both officers have been awarded an increase of salary, and Mr. Brierley also received an honorarium. The recommendations were made by Mr. Priestly, and Alderman Isherwood informed the Corporation that the two gentlemen had had very serious difficulties to face on account of the shortage of labour at the sheds, and they had put in a great deal of extra time and given extra services. Even with the advances recommended they would be still below the salaries paid in other towns of approximately the same size as Oldham.

Inspector H. Pilcher, on leaving Dover Corporation Tramways after 19½ years' service, has been presented with a watch, cigarette holder, etc., by the tramway staff. Mr. E. Carden, general manager, in making the presentation, said they were sorry to lose Mr. Pilcher, and he felt that his experience would be a great help in his future employment. He had done his work with a tact and carefulness that would be an immense help to him. For 17½ years he had served as inspector. In reply, Mr. Pilcher referred to the absence of serious accidents as evidence of the efficiency of the staff. Mr. Carden added that the freedom from serious accidents was due to the careful work of the employees. There had been no accident due to negligence. There had been two children accidentally killed, and one had fallen alongside a car. As the average number of passengers carried was three millions a year, this spoke well for the carefulness of the men.

Mr. R. S. Pilcher, general manager and engineer, Aberdeen Corporation Tramways, was congratulated by Councillor Robertson, chairman of the tramways committee, on the occasion of the presentation of the yearly accounts to the Corporation. That the undertaking had been so successful, the chairman remarked, was entirely due to the management of the general manager, supported by a loyal staff. Late and early they would always find Mr. Pilcher on duty. His work had been exceptionally trying, with so many of the staff on service, and no doubt at the end of the year the Corporation would recognise Mr. Pilcher and his staff for the extra work they had so willingly carried out. The Council applauded the latter remark, and the applause was renewed at the end of observations that fell from the Lord Provost, who said the success of the tramways was in a great measure due to the efficient manner in which the manager had carried out his duties. They would have noticed how very nearly they had lost Mr. Pilcher to Ireland, and while they regretted that he failed narrowly to get the promotion he deserved, they were thankful to be able to keep him.

Mr. J. S. D. Moffet, general manager, West Ham Corporation Tramways, who has been appointed to similar duties at Belfast, was the recipient on August 7 of a silver rose-bowl and a pair of binoculars from the shed, traffic, and works employees. Mrs. Moffet was presented with a silver dressing table set. The ceremony was attended in the recreation room by a large gathering of employees and their wives, and the presentation was made by Mr. W. T. Young, traffic superintendent, who referred to the happy relations that had existed between Mr. Moffet and his staff. In thanking the subscribers, Mr. Moffet regretted that the war would prevent him officially saying good-bye to 375 employees who would otherwise have been there. Owing to the war the social club, founded by Mr. Blain, his predecessor, had not been quite so prominent as it might otherwise have been, but he had to record that the name of Motorman Blunden, one of their most popular members, would long live in the memory of those employees who had been in the trenches for his work in collecting and sending out comforts subscribed for by every member of the staff. Referring to the somewhat strenuous three years he had spent at West Ham, Mr. Moffet regretted that he would not be there to see the fruition of the schemes he had inaugurated with the support of the Corporation for the benefit of the undertaking. These plans related to the remodelling of the cars, restoring the permanent way, and securing revenue by the new fares scheme that would come into force at an early date. He impressed upon all branches of the department that unless they all pulled together and loyally supported his successor no scheme could be a success. Mr. Moffet again thanked the subscribers for the handsome gifts, which would always remind him of the pleasant times he had spent in West Ham. Mrs. Moffet also expressed gratitude for the gift presented to her, and said that her chief regret in leaving was that she would not be able to assist in welcoming back the men who had gone to fight for their country.

WITH THE FORCES.

Lieutenant H. A. Holmes, Royal Fusiliers, who was wounded in the recent advance, is the second son of Mr. Henry Holmes, superintendent of the line, London and South Western Railway.

Lieutenant C. W. P. May, Royal Flying Corps, son of Mr. Wm. C. May, chief traffic manager of the Great Eastern Railway, has been awarded the Military Cross for conspicuous bravery and skill.

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Lieutenant D. Hughes, Gordon Highlanders, who during the first week in August was reported wounded and missing, was formerly assistant electrical engineer at Llandudno. He enlisted soon after the outbreak of war, and won promotion.

Lance-Corporal A. Wigton, Royal Scots, formerly a motorman on the Glasgow Corporation Tramways, has been awarded the Military Medal for bravery. He has also received the French Medal Militaire. He has won distinction as a grenadier in France.

Second Lieutenant (Temp. Captain) H. C. Sparks, London Regiment, has been awarded the D.S.O. for conspicuous gallantry during an attack on the German trenches. The gallant officer is the brother and partner of Mr. C. P. Sparks, president of the Institute of Electrical Engineers.

Mr. E. S. Haslam, assistant electrical engineer, George Town electricity and tramways departments, Penang, is stated in the annual report of Mr. O. V. Thomas, chief engineer and manager, to have been in England on leave at the outbreak of the war. He joined the colours, and is now in France.

Private E. Smith, a Birkenhead Corporation motorman, early in the war joined the 13th Cheshire Regiment, and was discharged as physically unfit for war service. Although he was over forty years of age, he then entered the motor transport section of the A.S.C., and has been in France and Belgium since March last.

Corporal O. G. Kingston, Gloucester Regiment, formerly a conductor on Gloucester Corporation Tramways, has received the Military Medal by immediate award on the field. Subsequently he was wounded, and was temporarily buried by the blowing up of a dug-out in which he was receiving attention from the medical officer. The medical officer has informed the corporal's mother that her son "worked like a horse for three days and nights with hardly any sleep or food, and at the end did not come out with the battalion, but stayed behind voluntarily to help another regiment. He was perfectly calm in the hottest fire, and gave confidence to all around him. He is a very great loss to the battalion, every man in which recognises how splendidly he behaved."

Since the British advance in France in July there has been an increasing list of killed and wounded among tramway soldiers who are sustaining the honour of the Empire on the field of battle.

Captain A. E. Stone, who has been killed in France, was for many years private secretary to Sir George White, chairman of Bristol Tramways and Carriage Company, and head of the firm of Messrs. George White & Co.

Captain J. A. Rutherford, who has been killed in action at the age of 27 years, was an electrical engineer in the service of the Rangoon Electric Tramways and Supply Company. He held the degree of Master of Engineering of Liverpool University.

Sergeant G. H. Rastall, Royal Lancaster Regiment, who has been killed in the fighting on the western front, was formerly employed by the Manchester Corporation Tramways department. Besides having gained the D.C.M., he had been decorated with the Russian Order of St. George (Fourth Class).

Corporal F. Perry, son of a Cardiff motorman, and formerly a conductor himself, has died of dysentery in Mesopotamia. Corporal Perry enlisted in the R.F.A. about six months before the outbreak of war. He was wounded at Armentieres, and on recovery returned to France, proceeding to the East three months ago.

Corporal J. Riley, King's Own Yorkshire Light Infantry, and for several years a motorman on the Ilkeston Council Tramways, was killed in action in France on July 3. A letter from his company commander states that he was gallantly doing his duty, and that all the officers of the company held a high opinion of him. The gallant soldier leaves a wife and two children.

Second Lieutenant Lycett, who has died from wounds sustained in France, was a young engineer connected with the firm of Tilling-Stevens, Limited, by whom his services were greatly appreciated. Mr. Lycett was the son of Mr. J. A. Lycett, a member of the Council of the British Electrical Federation, Limited, and managing director of several of the affiliated electric traction companies.

Inspector D. Menzies, who has died of sunstroke, enlisted a year ago in the Royal Flying Corps, and was attached to the Indian Expeditionary Force. Mr. Menzies, who belonged to Dundee, was for years connected with the Broughty Ferry Tramways, and was an inspector when he left to take over the duties of chief inspector of Dunfermline and West Fife Tramways upon that company being founded.

All tramway workers will be interested in the appended extract from a letter from Lieut.-Col. W. D. Sanderson, commanding the Loyal North Lancashire Regiment, announcing the death of **Private J. Livesay,** formerly an employee on the Blackburn Corporation Tramways. The deceased was the colonel's orderly, and he "always accompanied me on my visits to the trenches. I feel I have lost a personal friend. He was always so cheerful and ready for his duty at any time. Please accept my deep sympathy."

Lieutenant G. S. Kaye Butterworth, who was killed in action on August 4th, was the only son of Sir Alexander Kaye Butterworth, general manager of the North Eastern Railway. Lieut. Butterworth was educated at Eton and Trinity College, Oxford, and from an early age he evinced great musical talent. When war was declared Lieut. Butterworth enlisted in the Duke of Cornwall's L.I., and was soon given a commission in the Durham L.I. He was abroad for a year and was slightly wounded. A week later he was killed after successfully taking an enemy trench at the head of a bombing party.

RAILWAY OFFICERS AND STAFF.

Lord George Hamilton, chairman of the Metropolitan District Railway, has been appointed chairman of the commission of inquiry into the Mesopotamia campaign.

Mr. W. W. Thornton, general manager, Great Eastern Railway, has been appointed Honorary Lieutenant-Colonel in the Engineer and Railway Staff Corps.

Sir Sam Fay, the general manager of the Great Central Railway, is stated to have been chiefly instrumental in persuading the Government to adopt the Summer Time Act for the duration of the war.

Sir Gilbert Claughton, chairman of the London and North Western Railway, is a member of the committee appointed by the Government to inquire into the position occupied by natural science in our educational system.

Mr. E. C. Geddes, deputy general manager, North Eastern Railway, since 1910, who is one of the new knights, on the formation of the Ministry of Munitions was appointed one of Mr. Lloyd George's principal assistants. He has served as claims agent, commercial agent, and chief goods manager of the N.E.R., which he joined in 1904. Previously he was employed for fourteen years on American and Indian Railways, and he began life as a station porter. He has also worked in an American lumberyard.

BRISTOL TRAMWAYS.

CORPORATION'S PRELIMINARY EXPENDITURE OF £8,067.

Bristol City Council on July 25 received a report from the Tramways Option Committee, who were appointed in February, 1913, to consider the question of the advisability or otherwise of the Corporation exercising their option of purchasing the Bristol tramways undertaking, stating that the total expenses incurred by the Corporation had been £8,067 18s. 3d. The following detailed statement was given :—

EXPENSES INCURRED BY THE COUNCIL IN CONNECTION WITH THE BRISTOL CORPORATION (TRAMWAYS) ACT, 1914.

	£ s. d.	£ s. d.
Counsels' Fees—		
Hon. J. D. Fitzgerald, K.C.	444 13 6	
G. J. Talbot, K.C.	295 1 0	
T. E. Sparrey	239 8 0	
W. E. Tyldesley Jones	201 1 6	
		1,180 4 0
Parliamentary Agents' Fees and Disbursements—		
Messrs. Dyson and Company	1,007 10 6	
Messrs. Robins, Hay and Company	12 18 6	
		1,020 9 0
Expert Witnesses' Fees—		
Sir John Snell	274 10 5	
Mr. J. B. Hamilton	646 17 6	
Mr. J. M. McElroy	244 13 0	
		1,166 0 11
Census of tramcar and motor omnibus traffic, 1914		447 3 0
Advertising and billposting		48 9 5
Miscellaneous expenses (maps, etc.)		400 1 10
		4,262 8 6
Poll of City—June, 1914		869 5 0
Total		£5,121 13 6

EXPENSES INCURRED BY TRAMWAYS OPTION COMMITTEE FROM FEBRUARY, 1913, TO JULY, 1916.

	£ s. d.	£ s. d.
Experts' Fees—		
Sir John Snell	923 16 1	
Mr. J. B. Hamilton	695 13 6	
Mr. J. M. McElroy	85 2 0	
Mr. C. P. Sparks, including retaining fee	343 17 0	
Sir Maurice FitzMaurice, retaining fee	157 10 0	
Mr. Andrew Young, retaining fee	105 0 0	
		2,310 18 7
Counsels' Fees—		
Sir R. B. Finlay, K.C.	18 12 0	
Hon. J. D. Fitzgerald, K.C.	13 7 0	
G. J. Talbot, K.C.	5 10 0	
		37 9 0
Printing		291 1 10
Census of tramcars and omnibuses, 1913		31 13 0
Miscellaneous expenses		275 2 4
Total		£2,946 4 9

SUMMARY.

	£ s. d.
Expenses incurred by the Council	5,121 13 6
Expenses incurred by the Tramways Option Committee	2,946 4 9
Grand total	£8,067 18 3

The committee point out that the expenses incurred in obtaining the Act were considerably increased by the fact that the Corporation had to meet considerable opposition by the Tramways Company and by certain ratepayers and others. They add that but for such opposition the cost would probably not have exceeded £2,000.

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TRAMWAY AND LIGHT RAILWAY NOTES.

ABERDEEN.

URGENT NEED FOR NEW CARS.

On the termination of the war the Corporation Tramways Committee will require a large number of new cars, according to the annual statement of their chairman. During the past year the cars ran 59,605 additional miles, and the manager is now running practically the whole of the stock at rush times and on Saturdays. At present he can see no prospect of obtaining any more cars.

BLACKPOOL.

RESPONSIBILITY FOR RESTRICTED LIGHTING.

At the hearing of a summons against the motorman of a Corporation tramcar for a breach of the restricted lighting regulations, the defence was that the conductor was responsible for the lighting arrangements of the car. Evidence to that effect was given by Chief Inspector Birtles, of the tramways department, who added that the shade on the top deck light was taken off by a passenger. This was frequently done by people who wanted to read newspapers. Replying to the clerk, the witness admitted that the driver would not be justified in starting the car if the light was not there when leaving the depot. A police-sergeant informed the court that the drivers reported ten minutes before the time for starting duty, and should see that all brakes and lights were in perfect working order, and if anything went wrong during the day they had to report it at night. The clerk advised the police to summons both motorman and conductor in future cases, and a fine of £1 was imposed.

CROYDON.

EMPLOYEES' SUGGESTIONS INVITED—LOYAL WORKERS REWARDED —INCREASED FARES ON CARS AND OMNIBUSES.

Mr. T. B. Goodyer, tramways manager of Croydon Corporation, has invited the staff to appoint delegates to meet him from time to time to discuss freely matters connected with staff working. One motorman and one conductor is to be selected from each depot to act as delegates, and it is proposed that these should meet at the manager's office at arranged periods. A box is to be provided at each depot, in which suggestions may be placed for consideration at the conferences. The boxes will be cleared by the depot inspector several days before the meetings, and the contents will be handed to the manager, so that the matter which it is suggested should be dealt with may be previously considered. The Corporation have adopted a recommendation by the tramways committee that the sum of £350 be allocated to the employees who remained at work and undertook extra duty during the recent strike. The allocation is as subjoined :—Twenty-five motormen, a £3 bonus ; five male conductors at £3 each ; thirty-six women conductors at £2 ; fourteen inspectors, two weeks' wages ; twelve regulators, ditto ; also three point lads, two men of the depot staff, and the official staff. The increased fares on the Corporation Tramways, the Metropolitan Electric Tramways, and the motor omnibuses running in the Croydon area took effect on August 14. The increases were due to the need for Croydon Corporation Tramways to secure an increased revenue in order to meet the cost of concessions made to the employees.

EDINBURGH.

TRAMWAY COMPANY SUED FOR CAB FARES.

Judgment has been given in Edinburgh Sheriff Court in the action in which Mr. Hendry sued the Edinburgh and District Tramways Company for 2s., the cost of two cab fares expended by him on two separate occasions, when, being the holder of a three-halfpenny transfer ticket, the car system on the second portion of the journey had broken down. Sheriff Guy has sustained the pursuer's plea that the defenders were in breach of contract, and allowed a proof of the loss and damage sustained.

GLASGOW.

SUGGESTED CURTAILMENT OF SERVICES—REQUEST FOR ALL-NIGHT CARS—WOMEN DRIVERS—AIR RAID INSURANCE.

The curtailment of the services from midnight to 11 p.m. has been suggested to the tramways committee by Mr. J. Dalrymple, the general manager. This is in consequence of the increasing great depletion of the staff due to military and naval service, and the dangers attending traffic during the restricted lighting in the winter. A further consideration is that nearly 600 of the traffic staff are working seven days per week. Under these circumstances there is no prospect of the tramways committee giving encouragement to a request for an all-night service to the Springburn district. A deputation was to have waited on the committee on August 16 to urge the need for all-night cars, but the manager has announced that it is only with great difficulty that even the day services can be maintained. It is of interest to mention that in December last the London County Council abolished workmen's tickets on the cars specially run as all-night cars, and decided that ordinary fares should be charged on cars scheduled to arrive at or leave central termini up to 3.30 a.m. In the United States there is an increasing objection on the part of road car undertakings to the running of the unprofitable "owl" cars, as the late cars are termed, and applications have been made in several instances for sanction to their discontinuance. An indication of the shortage of car hands in Glasgow is given by the announcement that on Aug. 24, 160 women were employed as drivers, and that many more are being trained in view of vacancies that will be caused as more men are called to the colours. The department expended during the year ended May 30 the sum of £3,467 on insurance against damage by aircraft.

HUDDERSFIELD.

ORDERLY LOADING AT WEST VALE.

A correspondent of a Halifax newspaper has testified to seeing 314 people awaiting a Huddersfield car at West Vale. They were standing most orderly two or three deep, and no official was present to encourage this formation.

LONDON.

COST OF A QUARTER'S ACCIDENTS—LEAVING BY THE FRONT DOOR TO MANIPULATE POINTS—HALFPENNY FARES.

At their last meeting before the recess within the three months ended June 30, London County Council Tramways Department settled 1,333 claims in respect of accidents arising in connection with the tramways, the total sum paid being £10,438. In 29 other cases actions were brought against the Council. In 13 of these a verdict against the Council was given, and sums amounting to £1,921 and costs had to be paid. Claims made in respect of damage done to tramways property were settled for £807. A knock-for-knock agreement with a firm of brewers in regard to claims not exceeding £5 has been terminated, and in future no claim will be made by either party if the extent of the damage to property does not exceed £5. In an action brought against them in Bow County Court, West Ham Corporation agreed to pay £8 damages and costs to a passenger who had had the forefinger of her right hand caught in the front door of a car. Evidence was heard to decide whether there had been negligence. Plaintiff stated that while the car was slowing up the conductor, in order to alight to shift the points, opened the front door and slammed it behind him. As he did so the car was pulled up suddenly. The jolt caused plaintiff to stretch out a hand to save herself, the forefinger being caught by the closing door. The conductor gave evidence that plaintiff stated neither he nor the driver was to blame, and that there was no jolt. Judge Graham directed the jury that the conductor should have looked before closing the door, and they found that defendants had been negligent. London County Council on August 1, by 52 votes to 34, instructed the Highways Committee to report, after conference with the Leyton Urban Council, and with West Ham and East Ham Corporations, as to the desirableness or otherwise of abolishing or suspending halfpenny or other particular fares or of varying fare stages on the through routes with which those authorities are concerned. This decision was arrived at in consequence of a communication received from Leyton and West Ham stating that they were agreeable to the abolition of halfpenny fares. While agreeing to a conference, the County Council affirmed that no sufficient cause had yet been shown for abolishing halfpenny fares.

MANCHESTER.

PAYMENT OF FARES ON THE PLATFORM—FRONT EXIT EXPERIMENT.

Notices recently posted in Manchester cars indicate that passengers may where convenient pay their fares on the platform when entering the cars. Since women conductors have been employed considerate passengers have handed their fares to the conductors, the women thus being saved unnecessary journeys up and down stairs. This practice, hitherto contrary to the regulations, has been "legalised" by the following notice :—"Payment of fares by outside passengers. —In order to assist the guards, passengers intending to travel on the upper decks of the cars are requested to hand the exact amount of the fare to the guard on the platform before proceeding upstairs. This method of payment is, however, not to be resorted to at busy loading places." In connection with the discussion of the payment on entry system, Mr. J. M. McElroy has stated that just before the war he was experimenting with a car that gave an outlet towards the nearest footpath at each end. The object was to lessen the time occupied in loading and unloading at busy places by requiring passengers to leave at the front end. Owing to the war further expenditure on the experiment had been stopped.

NEWCASTLE-ON-TYNE.

CITY ENGINEER'S REPORT ON THE PERMANENT WAY—PROSPECTIVE RENEWALS AND THE WAR.

In his annual report Mr. W. J. Steele, city engineer, states that the length of tramway opened for service measured as single track was 60½ miles. The cost of maintenance of the permanent way was £9,545, equivalent to £143 per mile of single track, or 0·40d. per car-mile. In addition to ordinary maintenance, £1,581 was expended in renewals, equivalent to £24 per mile of single track, or 0·06d. per car-mile, so that the total cost of the permanent way (exclusive of capital charges) was £11,126, equivalent to £167 6s. 1d. per mile of single track, or 0·46d. per car-mile. A considerable length of the permanent way was in urgent need of renewal, but the great difficulty in obtaining a sufficient supply of labour prevented that necessary work being undertaken. The major portion of the track had been in use for nearly fifteen years, consequently

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the fact that the present heavy service on a permanent way having many steep gradients was maintained at such a comparatively small cost was satisfactory, but it was inevitable that the cost would be greatly increased as soon as opportunity would permit of renewals being carried out.

PAISLEY.

TIMELY ADVERTISING FOR TRAFFIC.

In pursuance of their old policy of inducing traffic by means of advertising, the Paisley District Electric Tramways Company's management has been paying special attention to the matter since the abolition of excursion fares on the railways. The cars now carry a series of posters on the upper part of the lower saloon windows, and the inscriptions can be read by people in the streets. One placard advises munition workers to keep up their health by indulging in a trip to a popular spot; another refers to the value of a breezy run for "tuning you up." An exhortation is given to passengers to have their fares ready, and "safety first" is promoted by the appended announcement:—"Only fools and athletes board or leave a car in motion. The former run the risk of being injured, the latter of being fined."

PORTSMOUTH.

SPECIAL CARS FOR WOUNDED SERVICE MEN.

The tramways department on August 21 introduced an arrangement for placing six cars a week at the disposal of the patients in the military and naval hospitals. This is done between 1.30 p.m. and 4 p.m., the cars conveying the passengers to the South Parade pier or to any other place where there is a terminus. The vehicles there await the return of the patients from the pier concerts or other attractions to which they are admitted free. On these occasions the drivers are taken from among the volunteer motormen who are assisting the department.

SHEFFIELD.

HIGHER CHARGE FOR TRAMWAYS ENERGY—TEMPORARY SUSPENSION OF SERVICES—DANGER AT THE REAR.

The Corporation has adopted a recommendation by the Electricity Committee to charge higher rates for energy to all consumers. To the Tramways Committee the decision is estimated to entail an increased expenditure of £7,000 during the ensuing half-year. Councillor Evans, chairman of the Electricity Committee, stated that 109 undertakings had increased their charges during the war. If the committee's station had not been coupled up with that recently taken over from the tramways, the latter body would have had to spend £70,000 on new plant. During the discussion it was stated that the Tramways Committee agreed to pay more than the average price owing to the extra cost of 10 per cent. entailed by the conversion into alternating current at their station. Sir Wm. Clegg, chairman of the Tramways Committee, said he was prepared to consider favourably a revision of the terms. Under the agreement they had paid £6,000 more than if they had retained control of their station. By a majority of three the Council refused to refer the matter to the two committees for consideration and report. There was a temporary suspension of the tramway service for over an hour at midday on August 12 on all but the eastern routes, due to the necessity for remedying faults that had developed at the generating station owing to the strain of the extra load entailed during the past two years. In order to warn passengers passing behind a car to beware of vehicles coming from the opposite direction, a Sheffield inventor has devised a removable and folding arm. This is attached above the fender or in any other suitable position at the rear. It bears the inscription "Danger," and at night it can be illuminated

ORIGIN AND DEVELOPMENT OF TICKETS.

At the concluding session of the series of operating efficiency meetings of the London Underground Railways and General Omnibus Group for the season 1915-1916, a paper on "Tickets—Their Origin, Use, and Development," was read by Mr. F. C. Bingham (Passenger Agent's Department), Mr. H. E. Blain, the operating manager, presiding over a good attendance. The paper, which was illustrated by a large number of slides, traced the development that had taken place in the booking of passengers from stage coach days to the present. On stage coaches, a system of booking was in operation that took the form of entries in a book, a waybill with corresponding particulars being given to the guard. These waybills contained the names and addresses and destinations of the passengers. Travellers from intermediate stopping points were only accommodated in the event of the coaches being short of their full complement of passengers. The first reliable information with regard to railway tickets being actually issued was in connection with a line called the Leicester and Swannington Railway, which really formed the nucleus of the present Midland Railway. This line was opened in 1832. Tickets of a metal form were introduced, the size being about one and a half inches in diameter. The first use of card tickets after the pattern of the present day tickets was about 1840, the idea being due to Thomas Edmondson, a Quaker, who was appointed station master of Milton, on the Newcastle and Carlisle Railway. The inventor rented his patent at 10s. per mile per annum. Hardly any change in railway tickets has taken place in the eighty years which have elapsed. Details of tickets used on the Underground Railways were given, these being of two kinds, one being known to the printing trade as "pulp" and the other as "ordinary card," the former being the cheaper and thinner production, and being used for local bookings. The method of requisition and supply to stations was described, and the author discussed various descriptions of tickets issued, including scheme tickets, workmen's tickets, and miscellaneous tickets.

Slides were shown of a number of ticket-issuing machines, including the standard electrical machine, the pull-bar machine, and the British electrical automatic machine, the first-named being the one in general use on the Underground. It is constructed to issue any of the ordinary forms of tickets, the principle being that a coin weighs down a balance, causing electrical contact and resulting in a slide pushing a ticket forward for delivery. The pull-bar type is constructed on similar lines to the ordinary sweetmeat machine, whilst the British electrical automatic machine prints and delivers a ticket.

The object of the various forms of railway ticket "cancels" (the name of the ticket nipping arrangement in general use) was:—(1) To reveal whether the tickets were being punched at other than the stations at which they were issued; (2) to prevent the use of tickets for a second journey; and (3) to show in the case of traffic where several interests are involved and tickets are cancelled two or three times on a journey, the route which has been actually traversed, this being the determining factor in the division of receipts. The methods and object of railway ticket-sorting offices were also described, and, amongst other interesting points mentioned, was the fact that the issue of the tickets on the Underground Railways amounted to about 300,000,000 per annum, as against 80,000,000 per annum on the whole of the London and North Western Railway.

On the omnibus side, the issue of omnibus tickets was not introduced by the L.G.O.C. until 1891, prior to which date a passenger paid his fare to the conductor, no voucher or ticket being given. Roll tickets were originally introduced by the London Roadcar Company, and their introduction in 1891 on the L.G.O.C. led to a strike in June of that year, which lasted for about ten days. The roll system was only, however, continued until 1893, when the bell punch system was adopted. The various changes in this type of ticket were described, and illustrations shown of the different forms of ticket in use, including two-journey, combined omnibus and rail, and other special tickets.

Various forms of punch were discussed, and in the subsequent discussion it was pointed out that although many attempts had been made to evolve an apparatus which would print and issue tickets of different denominations on some simple method, this had not yet been produced in a form which met with general approval, and the whole ticket system was one which called for close attention in the hope of improvement being effected.

PATENT LIST.

Abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

***** If the inventions have been communicated the names of the communicators are given below in italics.**

APPLICATIONS FOR LETTERS PATENT.

Brake mechanism for railway vehicles, etc. (10,910)—J. G. Brill Company and A. F. H. Head.
Safety guards for vehicles (10,782)—W. Brookes.
Motor vehicles (10,952)—C. G. Conradi.
Electric signalling apparatus (11,052)—E. A. Graham.
Cross ties and rail fastenings (10,901)—K. Jarvi and K. Makinen.
Variable speed gearing for motor vehicles (10,989)—R. F. Rowe.
Piston rods for use with vacuum brake cylinders (10,964)—Vacuum Brake Company (*Billinton*).
Electric lighting and heating of railway vehicles (10,855)—C. H. Vidal.
Self-acting brake for motor cars (11,166)—W. H. T. Beattie.
Vehicle wheels (11,270)—Dunlop Rubber Company.
Petrol motor starter (11,307)—W. Emery.
Apparatus for lighting, heating, and starting motor road vehicles (11,393)—J. Firth and W. F. W. Rhodes.
Means for propulsion of motor vehicles, etc. (11,216)—H. E. Freakley.
Self-acting brake for motor cars (11,166)—R. C. Pessell.
Air brakes (11,188)—H. Pieper.
Springs for road vehicles (11,184)—J. M. Sanders.
Direction indicating apparatus for road vehicles (11,255)—A. D. Thompson.
Four-wheel driving devices for motor vehicles (11,310)—J. L. Ware.
Means for telephonic communication to and from moving trains (11,397 and 11,658)—V. G. Werner.
Signal automatic vacuum train stop (11,589)—R. Barlow and W. E. Walker.

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Chairs for railway rails (11,545)—G. Black.
Air-relief valves for liquid fuel tanks of motor vehicles (11,677)—Boulton and Paul and A. Doe.
Brakes and non-skid devices for motor road vehicles (11,760)—W. Dawson.
Driving and braking mechanism (11,513)—W. F. Emerson.
Haulage of motor vehicles (11,808)—Ford Motor Company (*Ford Motor Company*).
Weight distribution on live axles of motor cars (11,733)—T. Ford.
Side-splash guards for road vehicles (11,796)—H. V. N. Graveley.
Rail joints (11,483)—D. P. Parker.
Concrete sleeper for railways and tramways (11,469)—R. S. Santalo.

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The name ORIENTAL represents the highest standard of quality in
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ORIENTAL TUBE CO., LTD.
West Bromwich, Birmingham
Wires: "Tubes, West Bromwich."
'Phone: 45, West Bromwich.

Electrically operated indicator mechanism (11,617)—W. R. Sykes Interlocking Signal Company and R. W. Tarrant.
Apparatus for actuating signals on trains (12,014)—W. H. Biddle.
Means for producing audible signals on trains (12,015)—W. H. Biddle.
Automatic train stopping devices (11,859)—C. I. Costello and A. L. Lyttle.
Spirit for the propulsion of motor vehicles (12,039)—W. S. Gibbs.
Axle boxes for railway vehicles (12,026)—H. R. Haigh.
Anti-skidding devices for vehicle wheels (11,928)—F. Nace.
Railroad ties (11,926)—P. V. Troupe.
Pneumatic wheels or tires applicable as road wheels to motor vehicles (11,819)—W. Willoughby.

Specifications Published.

1914.

Life-guards for use on motor vehicles (18,068)—Drandorff.

1915.

Tires for the wheels of motor road vehicles (11,299)—Ellis.
Speed-reducing gearing (13,735)—Dey.
Fenders for motor omnibuses (14,372)—Dimberline.
Road trains (15,620)—Fageol.
Anti-skid attachments for tires (6,987)—Gorecki.
Compressed air brakes (10,542 and 10,610)—Hildebrand.
Means for suspending and adjusting overhead conductors (11,172)—British Insulated and Helsby Cables, Limited, and Astley.
Electro-magnetically operated brake (13,679)—Lewis.
Conductors for the ignition system of motor vehicles (13,799)—North.
Signalling mechanism for railways (14,261)—Hollands.
Motor road vehicles (10,890)—Booth.
Detonator apparatus for railways (11,760)—Rouledge and Mackie.
Cantilever springs for motor vehicles (15,736)—North.
Fluid-pressure braking apparatus (16,608)—Westinghouse Brake Company.
Compressed air brakes (3,579)—Chapsal and Saillot.
Apparatus for stopping trains independently of drivers (9,275)—Nevitt.
Radiators for motor vehicles (12,067)—Harvey.

1916.

In the following list the numbers in italics are those that the specifications will finally bear and under which they will be indexed and abridged before acceptance and finally printed. The application numbers should, however, still be used for correspondence purposes.
Fluid-pressure braking apparatus (588—*100,818*)—Westinghouse Brake Company.
Couplings for road trailing vehicles (2,237—*100,855*)—P. de Monts.
Railway signalling (3,002—*100,856*)—A. Kerr.
Machines for dressing rails (322—*100,971*)—J. W. Eunson and Woods-Gilbert Rail Planer Company.
Steering gears for motor vehicles (3,815—*100,979*)—W. O. Kuhn.

Colonial and Foreign Tramways Traffic Returns.

NAME OF COMPANY.	1915. WEEKS ENDED. Aug. 7	Aug. 14	Aug. 21	Aug. 28		1916. WEEKS ENDED. Aug. 5	Aug. 12	Aug. 19	Aug. 26		AGGREGATE. Wks.	1916.	Increase or Decrease.
	£	£	£	£		£	£	£				£	£
Anglo-Argentine	51,413	50,848	50,932	48,885	...	49,487	48,752	48,713	48,713	...	35	1,724,056	− 9,636
Auckland	20,408	(28 days)	...	...	...	21,507	(28 days)	...	...	...	4	21,507	− 646
Burma... ... ... Rs.	...	...	...	...	...	...	...	...	...	...	—	—	—
Calcutta ... ... Rs.	65,826	66,307	68,785	66,852	...	72,869	69,547	69,919	65,092	...	35	2,296,320	+101,598
Hong Kong ... ... $	...	...	...	...	...	...	...	...	...	...	33	420,128	+ 95,286
Madras ... ... Rs.	(2 weeks)	30,869	...	...	...	(2 weeks)	32,269	...	...	...	33	469,380	+ 33,100
Pernambuco ... ... $	2,850	2,902	2,813	2,719	...	3,125	3,140	3,193	2,996	...	34	101,562	− 4,228

Companies Issuing Monthly Statements.

	1915. March.	April.	May.	June.	July.	Aug.	1916. March.	April.	May.	June.	July.	Aug.	Wks.	AGGREGATE. 1916.	+ or −.
	£	£	£	£	£	£	£	£	£	£	£	£		£	£
Brazilian Traction Mlrs	6294910	6333460	6670110	6591940	6703000	...	6711000	6678000	7091000	6961000	7195000	...	31	47,145,000	+2,757,890
Brisbane	30,740	29,890	31,780	29,880	31,150	...	34,275	32,575	33,510	31,390	32 880	...	31	227,230	+ 17,580
British Columbia $	557,135	540,861	512,568	498,093	510,723	...	577,117	549,046	542,353	529,078	538,293	...	5	538,293	+ 27,570
Buenos Aires Pt. & C.	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Buenos Ayres Lacroze	44,332	41,765	44,480	40,421	41,460	41,468	42,219	40,220	41,503	36,213	38,439	36,431	9	74,870	− 8,058
Cape Town	...	...	...	...	...	...	14,994	...	...	12,920	13,357	...	—	—	—
Carthagena & Herrerias	2,436	1,496	1,931	2,059	2,157	1,523	2,991	2,513	2,927	3,512	2,371	2,081	35	20,821	+ 6,493
Cordoba	12,746	13,609	14,494	14,059	14,375	...	13,598	14,053	14,868	14,129	14,263	...	18	57,313	− 776
East India	1,846	1,864	2,119	2,194	2,231	2,266	2,196	2,116	2,161	2,283	2,220	2,522	4	2,522	+ 256
Kalgoorlie	2,638	2,841	3,269	...	...	...	2,479	2,553	2,921	...	...	...	21	12,437	+ 1,035
La Plata	4,582	4,269	4,489	3,875	4,054	4,164	4,613	4,354	4,343	3,735	3,909	3,792	35	33,627	− 357
Lima	34,185	31,633	...	...	...	...	34,159	33,556	...	...	...	...	18	134,629	+ 5,614
Manaos	...	...	...	...	...	...	157,156	155,030	152,854	...	...	...	—	—	—
Manila	...	...	...	...	23,750	...	...	...	...	...	33,700	...	31	887,739	+ 39,986
Melbourne	...	...	...	...	...	...	69,542	...	69,275	...	...	...	—	—	—
Mexico ... $	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Monte Video	29,716	26,786	27,771	24,266	25,161	...	31,956	28,997	28,349	25,300	25,220	...	39	266,288	+ 14,435
Port Elizabeth ...	...	...	...	...	...	...	...	...	2,809	3,166	...	...	—	—	—
Puebla ... $	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Rangoon	5,217	4,964	4,887	4,997	4,629	4,510	5,501	4,849	4,589	4 205	4,357	4,253	35	37,191	− 1,693
Toronto ... $	820,750	795,816	795,262	787,558	773,013	...	910,969	883,209	903,924	884,491	867,789	...	31	6,202,988	+ 619,912
Winnipeg ... $	303,209	264,856	263,302	255,549	248,022	...	296,500	282,498	276,980	254,686	242,688	...	31	1,944,162	− 56,116

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TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1915. WEEKS ENDED.					1916. WEEKS ENDED.					AGGREGATE.		
	Aug. 7	Aug. 14	Aug. 21	Aug. 28		Aug. 5	Aug. 12	Aug. 19	Aug. 26		Wks.	1916.	Increase or Decrease.
	£	£	£	£		£	£	£	£			£	£
Aberdare U.D. Council	396	290	334	364		420	436	412	446		21	8,135	+ 810
Aberdeen Corporation	2,041	1,878	1,905	1,961		2,074	2,232	2,092	1,987		12	23,781	+ 697
Accrington Corporation	633	559	593	569		563	631	639	629		21	12,378	+ 392
Ayr Corporation	607	526	655	523		683	773	681	1,003		15	8,209	+ 500
Bath Electric	*	...	...	...		...	...	...	...		—	—	—
Birkenhead Corporation	1,488	1,419	1,428	1,462		1,663	1,699	1,642	1,613		21½	32,949	+ 2,924
Birmingham Corporation	15,371	14,383	14,739	15,105		17,010	17,394	16,636	16,900		21	349,440	+ 57,659
Birmingham Corp. Motor Omnibuses	1,059	907	914	951		1,186	1,405	1,089	1,067		21	21,275	+ 2,837
Blackburn Corporation	1,919	1,307	1,296	1,238		1,347	1,391	1,358	...		20½	26,966	— 996
Blackpool and Fleetwood	2,264	2,343	2,003	1,899		1,662	2,652	2,679	2,374		34	28,954	+ 2,603
Blackpool Corporation	5,074	4,390	4,006	3,555		3,587	5,541	6,394	...		20	46,603	+ 8,434
Bolton Corporation	2,771	2,657	2,819	2,860		3,096	3,076	3,036	3,038		22	62,768	+ 3,882
Bournemouth Corporation	2,952	2,859	2,986	2,704		3,303	3,350	3,288	2,969		22	53,376	+ 2,939
Bradford Corporation	7,415	6,579	7,139	6,748		7,355	7,294	7,223	8,017		21	148,245	+ 3,038
Brighton Corporation	1,776	1,577	1,624	1,602		1,817	2,093	1,942	1,898		21½	28,635	+ 2,494
Bristol	13,930	10,406	10,279	10,222		12,144	12,902	10,841	11,085		34	339,560	+ 13,824
Burnley Corporation	1,645	1,590	1,570	1,558		1,797	1,740	1,770	1,703		22	37,771	+ 1,790
Burton-on-Trent Corporation	365	311	299	298		300	323	322	319		21	5,843	— 552
Bury Corporation	1,423	1,445	1,501	1,457		1,560	1,561	1,568	...		21½	30,215	+ 1,200
Cardiff Corporation	3,087	2,909	2,889	3,005		3,365	3,589	3,252	3,365		21	64,333	+ 4,882
Chatham and District	1,628	1,390	1,350	1,426		1,528	1,668	1,469	1,498		34	41,110	+ 1,649
Chesterfield Corporation	339	280	275	...		365	320	306	...		—	—	—
Colne Corporation	322	282	272	279		313	320	308	314		—	—	—
Cork Electric	530	560	554	562		643	650	557	580		34	17,178	+ 143
Croydon Corporation	*	...	...	...		...	...	...	...		—	—	—
Derby Corporation	1,293	1,150	1,092	1,126		1,281	1,347	1,281	1,287		21½	24,685	+ 1,496
Dover Corporation	*	...	...	...		...	...	...	...		—	—	—
Dublin and Lucan	219	151	167	177		220	219	190	205		8	1,586	+ 196
Dublin United	7,291	6,215	6,349	6,551		7,516	7,820	7,018	7,073		34	202,854	— 3,847
Dundee City	1,379	1,334	1,373	1,445		1,523	1,573	1,473	1,491		14½	20,389	+ 585
East Ham Corporation	1,494	1,320	1,387	1,389		1,457	1,445	1,371	1,406		21½	28,548	+ 65
Exeter Corporation	462	449	465	462		499	511	485	475		21	8,606	+ 58
Gearless Motor 'Buses	*	...	...	...		...	...	...	...		—	—	—
Glasgow Corporation	21,000	21,415	21,763	21,341		23,931	24,110	23,638	20,766		12½	289,693	+ 23,133
Glasgow Subway	948	935	958	979		1,018	976	1,032	799		34	38,931	+ 3,751
Glossop (Urban Elec. Supply Co.)	141	135	138	157		152	154	153	143		35	4,792	+ 480
Halifax Corporation	2,520	2,532	2,520	2,526		2,551	2,647	2,875	2,753		20½	48,751	+ 570
Halifax Corp. Motor Omnibuses	57	71	59	47		59	59	72	63		20½	1,045	— 55
Hastings and District	1,794	1,621	1,566	1,644		1,623	2,082	1,930	1,909		34	34,785	+ 1,771
Huddersfield Corporation	2,992	2,927	2,752	2,782		3,246	3,357	3,387	3,044		21	63,805	+ 5,787
Hull Corporation	3,376	2,931	2,904	3,092		3,202	3,444	3,286	3,157		21	66,859	+ 1,007
Ilford U.D. Council	837	688	685	709		787	799	741	748		21	15,108	+ 775
Ilkeston Corporation	141	144	145	142		167	172	159	157		22	3,133	+ 159
Ipswich Corporation	830	708	666	717		612	669	605	590		21	11,883	— 396
Isle of Thanet	1,198	1,042	1,079	1,063		791	1,023	1,002	987		47	16,656	— 2,942
Kilmarnock Corporation	174	160	164	168		192	180	188	188		14½	2,640	— 16
Lanarkshire	2,071	2,103	2,179	2,173		2,481	2,773	2,593	2,631		34	77,599	+ 12,174
Lancashire United	2,313	1,739	1,811	1,943		2,061	2,328	2,052	2,036		34	60,754	+ 2,382
Leeds City	10,922	8,574	9,402	9,625		10,625	11,232	10,491	10,610		22	212,238	+ 18,560
Leicester Corporation	*	...	...	...		...	...	...	...		—	—	—
Leith Corporation	762	774	783	753		992	999	939	900		14½	13,373	+ 1,590
Leyton U.D. Council	2,062	1,668	1,912	2,138		1,999	2,120	1,868	1,904		21	36,267	+ 321
Liverpool Corporation	14,997	13,542	13,848	14,083		15,726	16,286	15,204	15,106		34½	478,451	+ 23,913
Llandudno and Colwyn Bay	570	805	681	706		580	643	967	877		37½	12,425	+ 82
London County Council	*	...	...	...		...	...	...	...		—	—	—
London General Omnibus	*	...	...	...		...	...	...	...		—	—	—
London United	*	...	...	...		...	...	...	...		—	—	—
Lowestoft Corporation	*	...	...	...		...	...	...	...		—	—	—
Maidstone Corporation	306	253	239	244		256	261	249	244		21	4,695	— 152
Manchester Corporation	18,324	17,693	17,971	18,255		19,671	20,134	19,235	19,575		21	405,742	+ 23,200
Metropolitan Electric Tramways	*	...	...	...		...	...	...	...		—	—	—
National Steam Car	*	...	...	...		...	...	...	...		—	—	—
Nelson Corporation	...	...	...	...		...	...	...	...		—	—	—
Newcastle-on-Tyne Corporation	6,572	6,415	6,524	6,566		7,322	7,055	7,008	6,996		21	141,002	+ 4,555
Newport (Mon.) Corporation	963	881	889	926		1,040	1,166	1,023	1,048		21	20,160	+ 1,670
New St. Helens and District	1,716	1,093	1,114	1,204		1,260	1,661	1,369	1,195		8	9,725	+ 456
Northampton Corporation	962	736	711	711		785	928	758	762		21	15,107	+ 1,363
Nottingham Corporation	4,419	3,663	3,758	3,949		4,187	4,444	4,158	4,213		21	82,265	+ 1,586
Oldham Corporation	2,381	2,324	2,475	2,510		2,726	2,614	2,529	2,788		22	56,768	+ 3,658
Portsmouth Corporation	3,301	3,171	3,087	...		3,644	3,807	3,422	...		—	—	—
Preston Corporation	982	1,082	1,013	975		1,120	1,120	1,258	1,177		20½	22,921	+ 2,454
Provincial	3,235	2,855	2,768	2,919		3,092	3,309	2,989	3,012		47	107,607	+ 5,801
Reading Corporation	1,023	894	874	872		978	1,001	945	991		20½	17,846	+ 791
Rhondda Tramways	1,134	1,215	1,179	1,187		1,428	1,408	1,518	1,366		33	41,371	+ 3,119
Rochdale Corporation	1,728	1,791	2,001	1,715		1,927	1,946	1,979	2,029		21½	39,583	+ 1,478
Rotherham Corporation	1,216	1,236	1,259	1,200		1,784	1,705	1,764	1,740		21½	33,253	+ 7,969
Salford Corporation	5,080	5,136	5,424	5,319		6,089	5,814	5,601	5,660		20½	120,666	+ 6,841
Sheffield Corporation	9,691	9,037	9,326	9,311		10,782	11,177	10,825	11,150		22½	232,972	+ 38,000
Southampton Corporation	1,814	1,715	1,649	1,779		1,935	1,986	1,939	1,969		20½	34,879	+ 2,786
Southend-on-Sea Corporation	1,796	1,415	1,332	1,288		1,430	2,024	1,960	1,860		21	21,626	+ 1,883
South Metropolitan Tramways	*	...	...	...		...	...	...	...		—	—	—
South Shields Corporation	1,015	868	872	922		1,012	1,018	933	952		21½	18,031	+ 648
Sunderland Corporation	1,949	1,667	1,574	1,622		1,939	2,003	1,789	1,729		21	35,376	+ 2,229
Sunderland District	812	657	...	667		785	833	752	716		43	25,992	...
Swindon Corporation	199	222	211	222		216	236	236	242		20½	4,276	+ 44
Torquay Tramways	782	882	926	933		863	1,072	1,040	1,098		34	19,620	+ 1,080
Tramways (M.E.T.) Omnibus Co.	*	...	...	...		...	...	...	...		—	—	—
Tyneside Tramways and Tramroads	811	628	678	712		808	867	789	688		8	5,864	+ 405
Wallasey Corporation	1,885	1,475	1,508	1,536		1,759	2,004	1,768	1,719		21½	30,997	+ 1,584
Walsall Corporation	1,026	789	847	838		871	1,050	884	928		35	28,023	+ 2,855
Walthamstow U.D. Council	1,286	1,002	1,184	1,169		1,425	1,551	1,196	1,296		21	24,374	+ 3,370
Warrington Corporation	513	459	468	455		521	535	533	519		21	10,305	+ 767
West Ham Corporation	3,595	3,096	3,476	3,737		3,571	3,567	3,329	3,374		20½	69,123	+ 2,190
Wigan Corporation	1,195	1,490	1,514	1,574		1,706	1,991	1,660	1,673		21	35,321	+ 2,952
Wolverhampton Corporation	*	...	...	...		...	...	...	...		—	—	—
Yorkshire (West Riding)	2,355	1,608	1,696	1,736		2,090	2,192	1,903	1,983		35	61,091	+ 5,495

* TRAFFIC RETURNS SUSPENDED.

Owing to the European war, the Government have taken over the railways of Great Britain as from August 4, 1914, and the issue of traffic returns has been suspended. Consequently the traffic returns of the electric railways which usually appear on this page cannot be given.

The Publication of the Traffic Returns of the Tramways marked with an asterisk in the above table have also been suspended during the war.

TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officals and the principal particulars relating to each undertaking.

THE TRAMWAY AND RAILWAY WORLD

can be obtained, post free, at the following rates:

For the United Kingdom—
Twenty-five Shillings per annum (including 64 issues, of which 12 are large illustrated numbers).

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Tel. No.: **2948** Gerrard.
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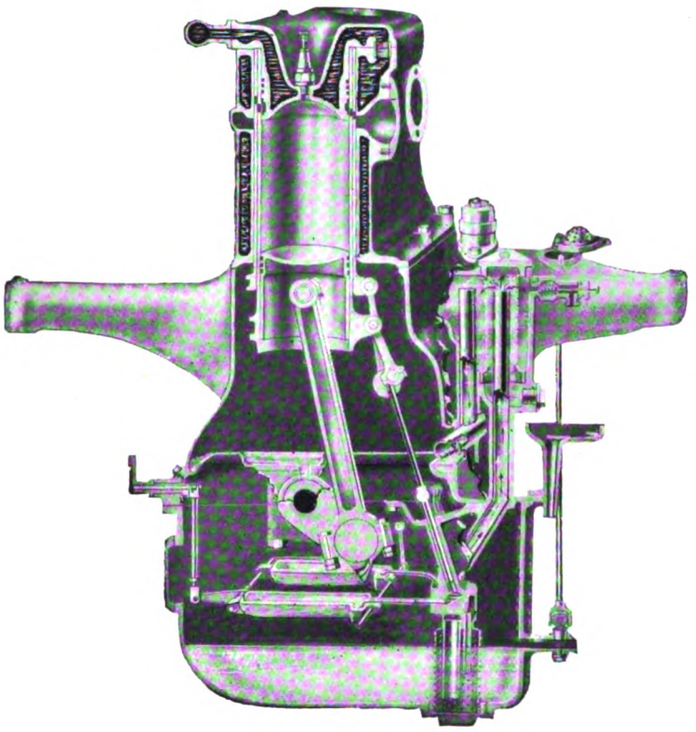

The Efficiency of the Daimler Sleeve-Valve Engine

Exclusive Features in principle and design which created a new standard—a superior class

THERE is a simplicity in the design of the Daimler Sleeve-Valve Engine which is apparent to every Commercial Vehicle user.

The sliding sleeve-valves have eliminated the troublesome springs and tappets, giving a permanent valve setting which is mathematically correct and unvarying for every cylinder.

The combustion chambers are absolutely uniform and perfectly machined. There is no roughness on which carbon deposit can be built up.

There is no valve cap as in the ordinary poppet-valve engine, but *there is* a constant maintenance of compression.

The efficiency of the cooling system is obvious. There can be no overheating or distortion, the wide waterways covering the inlet and exhaust ports and surrounding the sparking plug. It will be noticed that the sparking plug is directly in the centre of the spherical combustion chamber.

Detachability is supremely simple, but there is no necessity for cleaning until after 25,000 miles have been covered.

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These are **Acute** now. Be Independent by Purchasing a

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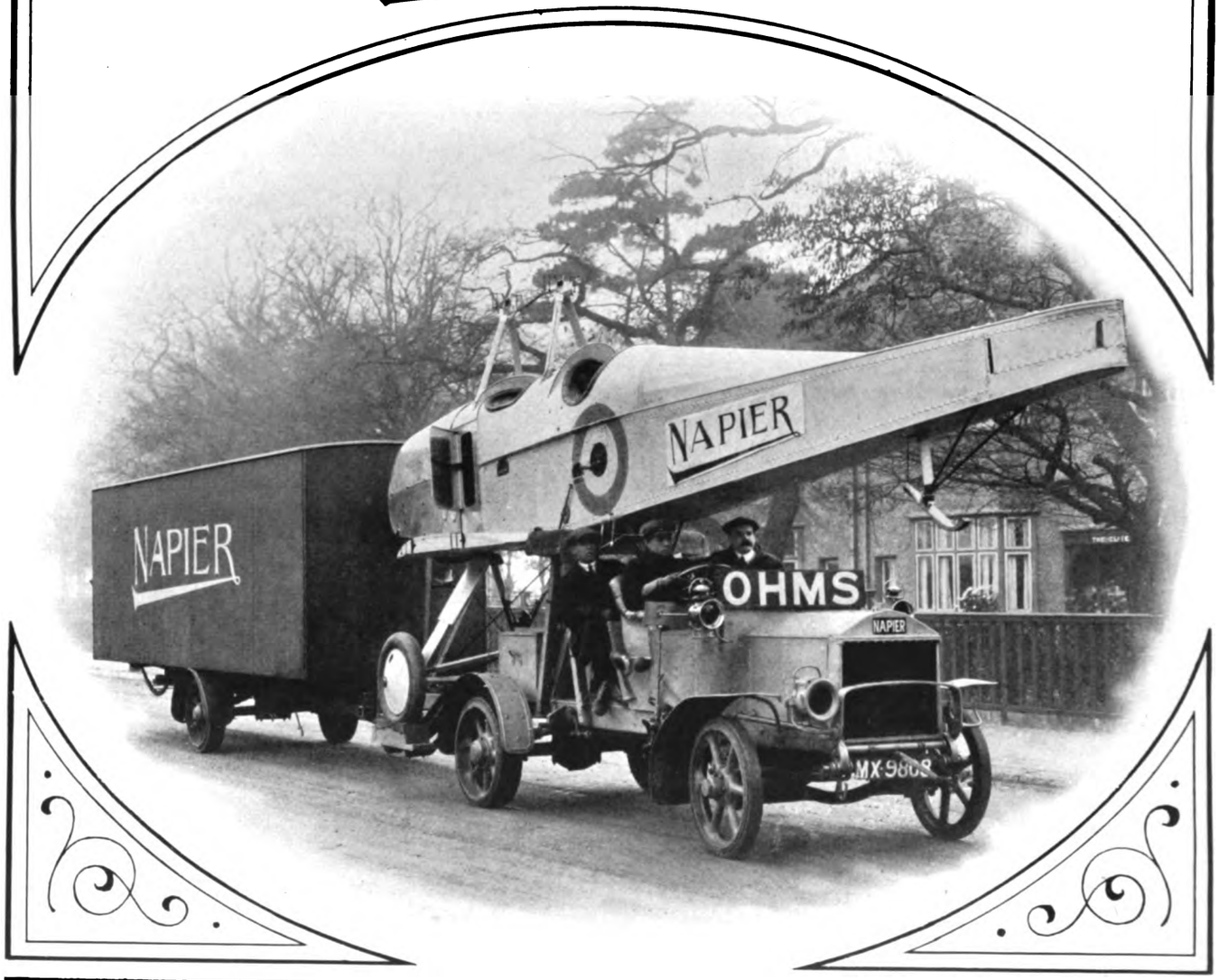

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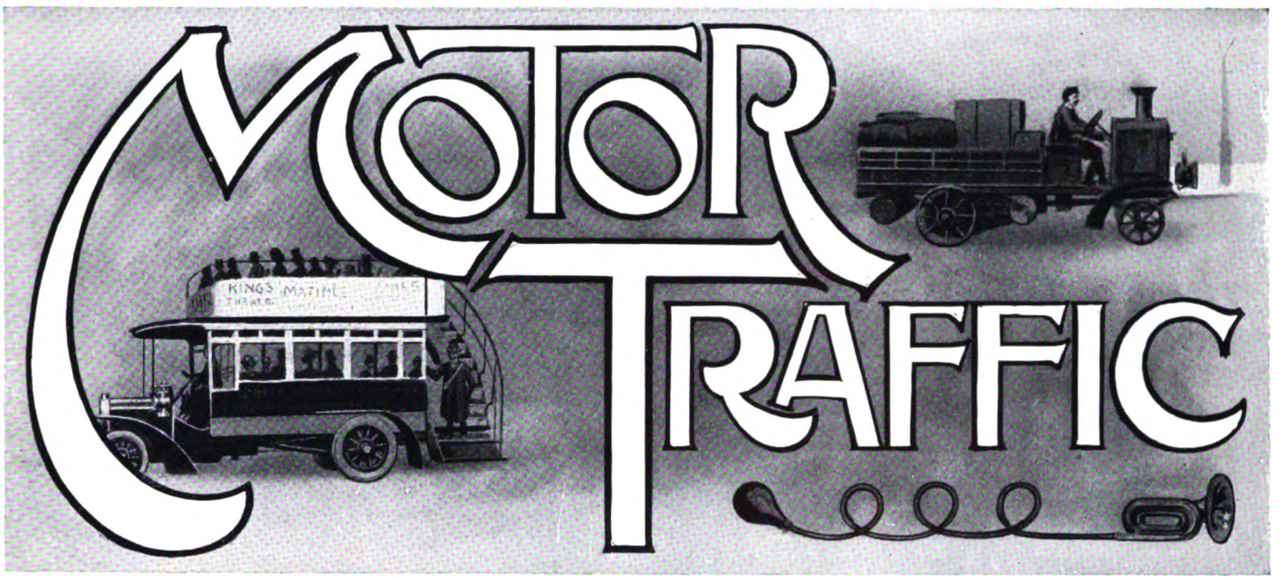

Although it is not proposed to interfere with the British manufacturers who are building subsidy type machines that are strictly in accordance with the War Office requirements as previously laid down, we understand that the scheme of the Munitions Motor Transport Department for the building of a new 4-ton model that will be equally suitable for service in Russia or France is finding favour with influential makers. The opinion is held that both from the efficiency and economic points of view a standard British machine is essential. It is a well-known fact that large consignments of American machines have been supplied to Russia, and as the advance of our Eastern ally proceeds the demands upon motor transport will be increasingly greater. Efforts should therefore be made to fill this demand from British factories. It is the opinion of those who favour this scheme that by standardising one type of machine and utilising all the available resources on an organised plan, the maximum demand can be met not only for our own requirements but for those of our allies.

* * * * * *

The special feature of the new model is the engine, which is much more powerful than is usually fitted to a 4-ton chassis. It is of the four-cylinder type, 5-in. bore with 6-in. stroke, and is designed to cope with the heaviest duty likely to be met with by a 4-ton wagon on either of the battle fronts. Only the high-tension magneto ignition is fitted. There is a four-speed gear box, and the final drive is by overhead worm. All steel wheels are specified. As it is only reasonable to expect, great care has been taken to eliminate all parts that have been found to be a source of trouble in actual practice. The design includes apparently nothing that has not been thoroughly tested in the light of practical experience under war conditions. The Motor Transport Department, as remarked in our issue of November 5, 1914, has had the best civil experience to draw upon, and with the advent of this new model the statement then made that "a right appreciation of the advantages to commercial motor manufacturers of the dissemination of the information and experience gained both with the British and captured vehicles may contribute towards gaining the ultimate victory for the allies" can now be taken in the prophetic sense.

* * * * * *

The task of the Departmental Committee appointed by the Home Office to inquire into the "Licensing of partially disabled motormen as drivers of public motor vehicles," which is referred to at length elsewhere in this issue, was difficult and far from enviable. At the same time it was very necessary, in the interests even of the men who might come under such category, that there should be a careful and impartial inquiry into their case. Otherwise, they were faced with the risk of arbitrary refusal of licenses by the police on public grounds, or, on the other hand, as a concession to sentiment, of being permitted to undertake duties for which they were unfitted. The latter contingency could only be dangerous from a general public and traffic point of view, and disastrous in the long run to the men themselves. The course adopted by the Home Office in appointing the Committee was both wise and humane, and its composition gave ample assurance both as to its competence and its disinterestedness. Its terms of reference were :—"To consider and report whether, having regard to the normal conditions of traffic in the Metropolis, licenses to drive motor cabs, motor omnibuses, or tramway cars should be granted to men who suffer from some partial physical disability by loss of a limb or other similar cause, and, if so, within what limitations." To those acquainted with London traffic conditions the conclusion by the Committee to the effect that licenses to drive public service vehicles should not be granted to men who have suffered the loss of an arm, hand, leg, foot, or eye, will occasion little surprise. It is, of course, regrettable that the circumstances permit of no other decision. The Committee were naturally reluctant to recommend that the door should be shut to this particular avenue of employment for men who have suffered in their country's cause. But they were convinced that the interest and safety of the public were at stake, and that they had therefore no option in the matter. Nobody will disagree with the remark in the Committee's report that for men compelled by reason of partial disablement to take up a new trade motor driving is the least suitable. It applies, of course, to private as well as public vehicles. Men who have never driven motor vehicles before should certainly not be encouraged at present to seek a means of livelihood in that direction. The supply of all kinds of drivers after the war is likely to be much in excess of demand, apart from any adventitious increase of numbers. There will, moreover, be a certain number of ex-public service drivers who, although no longer suited for that work, may reasonably be employed to drive trade vans or private cars, while others may perhaps be absorbed

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MOTOR TRAFFIC.

by finding them work other than driving, in and about garages, or possibly as inspectors and conductors. Everything possible should be done to keep men in the same sphere of employment, even though it may be no longer practicable to utilise them in their old capacities.

* * * * * *

The stoppage of the chars-a-bancs gives to the motor industry another event to associate with the war. Motor undertakings have had to put up with much in one way or another in the past two years, but there is probably some grounds for the belief prevailing among optimists that the worst is now known. So far as chars-a-banc enterprises are concerned, this particular vehicle has come in for so much criticism—not all of it well-informed or just—that far from being surprised at the recent suppression, most of us find it rather remarkable that it has been so long delayed. Owners of these vehicles are apt to feel aggrieved in being singled out for such drastic treatment. But, after all, they have had the best of their season, and to all accounts have done very well. The prohibition applies only to purely pleasure trips, and where passenger services of real public utility are involved there will be no suspension or curtailment beyond that occasioned by the petrol restrictions as applied to such services. As to those which are entitled to benefit by this definition a certificate issued by a chief officer of police will be necessary, and it is possible that some trouble may be experienced in connection therewith. It is placing a somewhat delicate responsibility upon an individual official in asking him to determine how far certain chars-a-banc services are "necessary or desirable in the interests of the travelling public." There are, for instance, certain all-the-year-round services between coast towns that may not be essential but are intensely convenient. Given an official with a mind of the type that regards the fact that people managed to do without them until a year or two ago as conclusive proof of redundancy, the proprietors may experience considerable difficulty in getting the necessary permission to run their vehicles. On the other hand, there may be a temptation to interpret the qualifications "necessary or desirable" too liberally. No provision is made for any appeal against decisions that may be grossly perverse, and, such being the case, it would have been better had some other means been chosen of settling this particular question than that of referring it to the chief constable, or, in fact, any other individual.

WAR TIME MOTOR CENSUS.

Motor Traction has published the 12th annual census of motor traffic taken by Mr. H. H. Griffin at Putney Bridge, London, S.W., on Sunday, June 25, during a period of twelve hours. The results reveal the disappearance of the horsed cab. Motor omnibuses numbered 1,701, an increase of 39; while motor cars totalled 1,109, the smallest figure since 1910. That the decrease was not greater afforded proof of the need for the compulsory economising of the petrol supply, especially as taxicabs showed the highest total ever recorded. Their number was 754, as against 703 in 1915. In 1905 and 1906 there was not one mechanical van. On this occasion there were 83, as against 47 last year. The increase was due to army lorries. Motor cycles increased from 413 to 516. In all there were 4,571 mechanical vehicles (against 4,318) and 99 horsed vehicles, the latter showing an increase of 31. The percentage of horse traffic was 2·30, as against 80·85 in 1905, while the mechanical vehicles showed a percentage of 97·01, as compared with 13·15 in 1905.

THE PETROL RESTRICTIONS.

Prohibition of Chars-a-Bancs Pleasure Traffic.

Under the Defence of the Realm Act, a regulation was promulgated on August 19 declaring that after September 1 motor spirit shall not be used for the purpose of chars-a-bancs or other like vehicles on any excursion or trips of any sort except (a) trips in connection with ambulance or hospital work or the conveyance of wounded soldiers; or (b) trips in connection with naval, military or munition service or the conveyance of munition workers to or from their work; or (c) trips that are certified by the chief officer of police for the police area in which the motor spirit is used to be necessary or desirable in the interests of the travelling public. Any person using, causing or permitting to be used, motor spirit in contravention of this regulation will be guilty of a summary offence.

The regulation has caused the abandonment of excursions run not only by a great number of seaside firms but by tramway companies that have taken up this form of enterprise. Prominent among the number is the Bristol Tramways and Carriage Company, which had already stopped pleasure excursions when the petrol licences were instituted. The company has branches at Bath, Cheltenham, Gloucester, and Weston-super-Mare. At the latter place September is the busiest month of the year. Before the war a chars-a-banc trip often extended over several days. As far as possible the company has maintained its day and night services of omnibuses and taxi-cabs.

The rationing of petrol appears to have been unnecessarily restricted. Reports indicate that there are large supplies in the hands of the distributors, and if the additional supplies expected are received within the next two months, a more generous allotment of spirit, at least to commercial users, may be anticipated.

Full Allowance Restored to Sheffield Corporation.

The Petrol Control Committee having informed the Sheffield Corporation Tramways department that their supply of petrol for motor omnibuses would be reduced by one-half, Mr. A. R. Fearnley, general manager, informed the committee that the reduction would seriously restrict the conveyance of munition workers and the conveyance of wounded soldiers to hospital. The sequel was seen in a statement made by Sir Wm. Clegg, chairman of the Tramways Committee, at the August meeting of the Corporation. Sir William announced that a representative of the Ministry of Munitions had been in the city during the last few days to inquire about the matter. He had realised the importance of continuing the omnibus service in its entirety, and that day the committee had received an intimation from the Ministry that their petrol would be restored to its usual quantity. The tramways department therefore hoped to be able to resume the whole service on August 11.

Sheffield Electricity Committee applied for a licence for 440 gallons of petrol per month in respect of the cars and lorries used by the electric supply department. In reply they received permits for 770 gallons for four months for the lorries and 84 gallons for three months for the cars. After considering representations made by Mr. S. E. Fedden, the electrical engineer, the Petrol Control Committee replied that arrangements had been made by which all industrial users recommended by the local representative of the Ministry of Munitions would have their requirements fully met.

Withdrawal of Motor Mail Vans and Motor Cabs.

Numerous motor mail services have been discontinued by the Post Office, and the business has reverted to the railway companies. The motor services were instituted on account of the high charges made by the railway companies, as well as to give more convenient and direct communication with many towns.

On account of the restricted supply of fuel, 2,000 of the 7,000 motor cabs in the Metropolitan area are being withdrawn early in the evening. The vehicles affected are those for which only one driver is available. These are granted only two gallons of petrol per day, while those that have two drivers in the 24 hours receive double that supply.

On August 13 further withdrawals and readjustments were made in 11 more of the services of the London General Omnibus Company. The company hope that it will be possible to maintain the remaining services at their present strength.

Twenty-four thousand owners of motor vehicles neglected to make returns of their petrol requirements during the stipulated period. Applications from them only began to be considered by the Control Committee on August 14.

Thomas Tilling, Limited, have been allowed by Reigate Corporation to take up licences for vehicles, drivers and conductors, that were held until recently by the London General Omnibus Company.

The Scottish Motor Traction Company, whose fuel supplies have been reduced by some 35 per cent., have withdrawn their vehicles from the less frequented routes, and suspended all private hire business for the time being.

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MOTOR TRAFFIC.

AUTOMOBILE EXPERIENCES IN THE WAR.

STEEL SUPPLANTING WOOD FOR WHEELS—TIRE TROUBLES—SHELTER AND LOCKERS FOR DRIVERS—CONVEYANCE OF TROOPS—FOUR-WHEEL-DRIVEN TRACTORS FOR GUNS—INCREASING USE OF TRAILERS.

In this issue we give the concluding portion of the paper on "Automobile Experiences in the Great War," read at the summer meeting of the American Society of Automobile Engineers by Mr. W. F. Bradley. The first instalment appeared in THE TRAMWAY AND RAILWAY WORLD of August 10. Alluding to the wood wheel, the author states that it is doomed for army vehicles. The primary objection brought against it is that it requires attention from time to time to keep it in proper condition. This defect is most apparent when trucks have to remain out of doors day and night, indeed on all occasions except when in the repair shop. Another objection is that if the vehicle catches fire—and the enemy's guns are constantly on the search for convoys working back of the lines—the wheels are liable to be destroyed, and it becomes a difficult matter to get the truck away. With metal wheels it is nearly always possible when the fire has burned itself out to tow the vehicle home. Apart from the body, it is surprising how little a burned-out truck will suffer. Practically no army trucks are now being built in Europe with wood wheels. All the Austin and other trucks supplied to the Royal Naval Air Service for use in France had their wood wheels changed for the steel disc type. Generally when replacements become necessary cast-steel or disc wheels are substituted for wood. For trucks of 3½-ton capacity and upward the cast-steel wheel of the spoke variety is extensively employed by French and Italian makers, and also by the British. The latter, however, are also partisans of the disc type.

EFFECT OF CAMBER AND SHELL HOLES UPON SOLID TIRES.

Not many years ago the French military authorities were inclined to favour the use of steel tires. The results were not satisfactory, the initial economy being more than offset by the greater cost of upkeep and the difficulty of operating the vehicles on greasy granite-paved roads. The war has proved the necessity of using rubber on all trucks and on all wheels. Block tires, for which many claims were made at one time, have not proved satisfactory. The alleged advantage of being able to replace a block has not been substantiated. One reason is that the new block always has a greater thickness than the worn unit it has to replace.

All kinds of tire troubles have developed, and, moreover, kinds unknown under peace conditions. Mileage has dropped very low, and many trucks in the north of France are not averaging more than 1,500 miles on a set of band tires. On some of the heavy gun cars 800 miles is considered a fair average and 1,500 miles excellent service. These, however, are special vehicles having a load of 7 tons and more, obliged to operate in a fire-swept zone not negotiated by any vehicles other than the two-wheeled carts of the A.S.C. One section of Pierce-Arrow 5-ton trucks doing ordinary transport service averaged 5,000 miles on a set of tires, but 4,000 miles can be considered a fair average. It has been suggested that the rubber is not equal in quality to that of peace times. There is nothing substantial in support of this contention, however. It is true that some damage is done by improper press work. The hydraulic presses to be found in all the repair depots are often in the care of men who cannot be considered experts, and who shorten the life of a tire in the fitting process. Tires do not perish principally by having their tread worn down. They chip away laterally; they come away from their base, sometimes for short distances, sometimes for their entire circumference; and generally they wear unevenly.

On all the cambered roads of France the inner one of dual tires carries the greater portion of the load, and, of course, wears down before the outer one. It is worth suggesting that some means of equalising wear be devised; a detachable and reversible wheel, separate from the bearing housing, would make it possible to get the full life out of a pair of bands, instead of having to scrap both when only one was worn. When dropping into shell holes and bumping over obstructions it was common to see chunks of rubber torn out of front tires, causing them to be withdrawn from service more frequently than the rear ones. The experiment was therefore made of fitting wider front tires and narrower rear ones. In the place of the original set of 36 × 5 front and 40 × 6 dual rear, the engineer had fitted 36 × 6 front and 40 × 5 dual rear. This change was satisfactory, the mileage being greater and the cost less. There was less tendency for the front wheels to bog, and drivers said that road shocks at the steering wheel were less. The angle of wear for the inner tire was reduced, the outer one taking the load sooner owing to the narrow tread. The tendency to skid was also considerably reduced.

FITTINGS FOR CARRYING WOUNDED ON RETURN JOURNEYS.

The body dimensions fixed for French trucks and confirmed by the war are a platform of 138 × 67 in. with removable sides 24 in. high. The driver's seat must be 55 in. wide. The hoops carrying the canvas top have to be of sufficient strength for each of them to carry a load of 660 lb., the central hoop receiving 1,300 lb. This allows wounded men on stretchers to be brought to the rear when trucks are returning after delivering supplies, and was done extensively during the series of battles for the possession of Verdun. Owing to this specification the hoops are generally of steel and are fitted with rings.

Many of the American trucks supplied to the Allied armies had a prairie schooner type of body, with a single top covering the load and the driver. This was a mistake, as the driver was left without protection when the nature of the load necessitated the removal of the top. With no division behind them, the men on the front seat were in the mouth of a draughty alley. It is essential that the two tops be independent, and that there be a vertical division just at the back of the driver. Drivers need much more protection than is given on the standard commercial vehicle. This protection has not been given by American makers.

The British have a preference for a permanent driver's cab with side doors and canvas extension above the dash, so that in bad weather only the upper portion of the driver's head is exposed. The roof of the cab carries a rifle rack. It is a primary condition that the rear wheels must not break the uniformity of the body platform. On this account the body is raised a little above the frame members. Advantage should be taken of the lateral overhang of the body to fit stout lockers alongside the frame members. This has been done in many cases to provide storage space for the regulation spares the truck must carry. Few makers appear to have realised, however, that a couple of men having to live and eat aboard the truck also need spares, and that no space is provided for their storage. This could easily be remedied by fixing additional lockers alongside. The lids should open upward.

Although special vehicles are provided for rapid transportation of troops, all trucks are liable to be called upon for this work. The body should be so designed that it can receive either a couple of longitudinal seats down the centre and about 6 in. apart or transverse seats. The fittings should not interfere with the normal service of the truck. The brightly tinted yellow or sandstone canvas tops supplied with many American trucks are a danger under European war conditions. The correct tint is grey, or blue-grey; or, better still, variegated, with blue-grey as the dominant note.

DEVELOPMENT OF FOUR-WHEEL-DRIVEN TRACTORS.

The rear-drive truck is the most satisfactory and the most economical type for the general transportation of food, ammunition, and men. The four-wheel-driven tractor first came into use five or six years ago, when the French sought to abolish the use of horses in the haulage of heavy field pieces. The artillery in the majority of cases has to work on no roads at all. The abolition of horses for haulage of the guns also implied the abolition of horses for the transportation of munitions; thus the tractors had to be capable of hauling trailers loaded with shells. It was not by any means sufficient to duplicate the points of application of the power in order to obtain a vehicle that could travel over any kind of country and surmount any obstacle. The four-wheel-driven tractor's real work begins when the going is such that the ordinary truck would have ceased to be of any use. A large amount of experience has been acquired in the use of chains, paddles, and caterpillar bands for the road wheels in order to allow these tractors to operate under all kinds of cross-country conditions. The results justify the belief that the horse has ceased to be necessary to the heavy batteries.

The French army has developed a heavy tractor capable of hauling not less than 12 tons, generally on two trailers, and a light tractor hauling a minimum of 8 tons. The unloaded weight of the heavy tractor is limited to 5⅓ tons, and the light tractor must not scale more than 3½ tons, these weights comprising the complete vehicle, two drivers, gasoline, oil, tools, and spares. Four-cylinder engines are employed exclusively. Every tractor is fitted with a power-driven winch or capstan. The winch placed horizontally across the front of the frame has been the most successful type. Towing hooks are fitted front and rear, an artillery-type elastic coupling is provided at the rear, a powerful sprag or ratchet is fitted, and the tractors have equal size dual tires. The use of these tractors has been confined largely to the haulage of 120 and 155 mm. field guns—heavy artillery that must nevertheless possess a reasonable amount of mobility.

PETROL TRACTORS FOR HEAVY GUNS—CATERPILLAR TRACTORS.

A certain number of the 75 mm. batteries have been motorised. The weight of this gun, without its carriage, is only 1,014 lbs. Thus it can easily be carried on a chassis designed for a 3½-ton load.

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MOTOR TRAFFIC.

The problem to be solved was a system of quick-acting jacks that would take all the weight off the springs when the gun went into action and give the same rigidity as with the ordinary gun carriage. For these guns the authorities have selected De Dion Bouton and Schneider 3½-ton chassis similar in general design. The engine is a four-cylinder of, roughly, 4¼ by 6 in. bore and stroke; the gear box provides four speeds; and final drive is by internal gears. These batteries have been successfully employed for anti-aircraft work. The ammunition wagons are of the same general design as the gun-carrying chassis. The hood is armour-plated. The gasoline tank is placed at the rear inside a steel box without a top. This gives it adequate protection against bullets and shell splinters.

For the haulage of heavy artillery—14, 15, and 16 in. guns—steam has been abandoned in favour of the internal combustion engine. Even the British, who have always shown a partiality toward steam, have adopted gasoline tractors for the haulage of heavy guns. In one case a traction engine chassis, made by a steam traction engine manufacturer, is employed, and is fitted with a six-cylinder Knight engine of about 6 by 6½ in. bore and stroke. The engine operates the large metal road wheels through internal gearing, and also drives a powerful winding drum. The tractors haul loads of 25 to 30 tons distributed over two or three trailers. Their rate of travel is three to four miles per hour. On certain occasions, when the enemy's lines have been broken by artillery fire, followed by infantry attacks, it has been found difficult to make this temporary success a permanent advance by reason of the slow rate at which the supporting artillery has been brought up over the broken country. It is under such conditions that the caterpillar tractor is used to best advantage. There is no kind of country over which it cannot move. A battery with forty-five tractors will have attached to it about forty 5-ton trucks and twenty 3-ton trucks for bringing up ammunition and supplies, as well as about fifteen trucks for repair service.

Before the armies went into the trenches armoured cars played an important part. The author gave particulars of their construction, and said it is an advantage for the car to be built to steer from both ends. He also observed that trailers are now attached to all kinds of motors, including ¾ and 1 ton vehicles mounted on pneumatic tires and fitted with the special army-type elastic coupling at the rear. These vehicles will take one or two two-wheeled pneumatic tired trailers, and are largely used for the transporting of men working in the rear of the lines and for general haulage around depots.

ROADS CONSTRUCTION AT THE FRONT.

With the aid of many road engineers from Great Britain, and a large force of civil and military labour, some excellent roads have been built up both out of and in range of the enemy's artillery. Steam road rollers have lately been supplemented with petrol motor rollers. With every capture of ground the need arises for further road construction, and there are places where the track runs over and along the rear of the trenches vacated by the Germans. Motor vehicles, however, use old tracks, no matter in how bad a condition they may be, long before temporary and permanent resurfacing is undertaken. The consequence is that great damage is done to tires, especially the pneumatics on the ambulance vehicles, a set often being rendered useless in twenty-four hours. Now that the British artillery has gained the ascendancy less damage is done by the enemy to the roads between the rest camps and the trenches, but in the first eighteen months or more of the conflict the condition of the roads owing to gunfire was the cause of much injury to tires of all descriptions. Some indication of this is given in the continuation in this issue of the paper read before the summer meeting of the American Society of Automobile Engineers by Mr. W. F. Bradley, on "Automobile Experiences in the War."

Italian Roadmakers' Great Work.

In an article written in August, when on a visit to the Italian front, Lord Northcliffe says:—"The full story of the rapid concentration of Italian forces, the organisation of fresh bases of supply, including water, of which there is none on the Asiago plateau, and particularly the problem of the conversiom of mountain mule-tracks overnight into splendid motor roads cannot yet be told. When told it will form one of the most thrilling chapters of the war. It was roads versus big guns. Roads won. In face of the strengthening of the Italian counter-pressure the Austrians hesitated to bring forward their heavy batteries. Hesitation proved fatal to their plans. The completion of the roads enabled General Cadorna to hold them, to battle them, until the Russian offensive prevented the Austrians from making good their severe losses and relieved the pressure on the Italians. The only door into Italy was slammed in the enemy's face. Now it is bolted and barred."

LONDON WAR WORKERS' OMNIBUSES.

Little publicity has been given to the great services that the London General Omnibus Company and Thos. Tilling's Omnibus Company have rendered to munition workers and to the country. Tilling's motor omnibuses have been running for years between Croydon and Woolwich, and during the war the service has been greatly augmented, thus providing facilities for a large area of the south-eastern part of the metropolis which was without convenient railway communication with the Arsenal and the numerous munition works outside of the district of the London County Council.

The greatest increase of the omnibus service has, of course, been provided by the London General Omnibus Company, whose vehicles link up all parts of the metropolis with the various munition areas. An indication of the extent to which the services running to Woolwich have been added to will be gathered from the appended figures. On routes 53 and 53A the increase since the outbreak of war has amounted to 37 per cent., on routes 101 and 101B to 50 per cent., while on routes 75 and 75A the increase is no less than 140 per cent. In addition, three entirely new services have been established. In view of these figures, the statement in a report recently made to the London County Council that accommodation provided by motor omnibuses in the Woolwich district showed only a slight increase, appears to have been based on insufficient knowledge of the facts. The war services performed by the Council's tramways have been so great that there could hardly be any temptation on its part intentionally to depreciate the services of other traffic authorities.

One of the developments during the past three months has had an important bearing on the question of national economy. At the instance of the Ministry of Munitions two tramway undertakings in north-east Kent gave up their intention to obtain powers to enable them to run omnibuses in order to link up with munition works, and arrangements were made with the omnibus companies to extend their services. Two new services recently put on in south-east London provide more direct and rapid communication with the Arsenal and factories than is given by the County Council and other tramways. On August 15 yet another service was instituted by the L.G.O.C. for munition workers and the public in a very wide area. The vehicles run between Farnborough (Kent) and Crayford, by way of Orpington, St. Mary Cray, and Bexley. This links up with Woolwich, Dartford, and Gravesend tramways. The fare is 6d., and the first omnibus starts at 5.15 a.m. The new service is the outcome of negotiations between the Minister of Munitions, Vickers, Limited, and other firms and the local councils.

ROAD CHARGES FOR OMNIBUSES.

On the recommendation of the Watch Committee, Grantham Corporation has consented to allow motor omnibuses to ply for hire on the highways on routes beyond those used on or before March 1, 1914, on payment of the following annual fees:—Under a ton weight, £5; over a ton and under 2 tons, £7; over 2 and under 2½ tons, £10; over 2½ and under 3 tons, £15; over 3 and under 4 tons, £20; over 4 tons, £25. The payments are to be made in advance by two equal half-yearly instalments in May and November. Omnibuses must be submitted for inspection in May and November, and certified as sound and in good running order.

York Tramways Committee have been asked by the Streets Committee of the Corporation to make a contribution in respect of road wear occasioned by the electrically-driven omnibuses.

South Wales Motor Transport Company has informed a conference of the local authorities in the Rhymney Valley that the directors cannot make any grant or contribution to the various authorities for the upkeep of the roads used by their omnibuses. The conference then decided to make it clear to the company that the amount asked for by way of contribution was for the whole route, and not for each Council. It was also decided to recommend each Council to renew the license to run the omnibuses for periods which would expire simultaneously on November 1, so that joint action could be taken in the matter at that time if thought desirable.

Hon. A. Stanley's Appeal for Russian Ambulances.—As chairman of the Royal Automobile Club, the Hon. Arthur Stanley, M.P., has received an appeal from the Russian Red Cross Society for several motor ambulance cars. As the result of the Club's appeal in September last ambulances were sent to the Russian forces in Persia and Asia Minor. Mr. Stanley states that if the much-needed ambulances are to be used by our splendid Russian Allies during the coming winter they should be despatched as soon as possible, and he asks that donations should be sent to the Secretary, Royal A.C., Pall Mall, London, S.W.

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MOTOR TRAFFIC.

LONDON OMNIBUS TRAFFIC.

A Reminder of its Usefulness by Sir A. Stanley.

Assuming that the Petrol Control Committee have to adhere to their intention to reduce the supplies of petrol to commercial vehicles 50 per cent., Sir Albert Stanley, managing director of the London Traffic group, has stated in an interview that if the London General Omnibus Company cannot obtain sufficient supplies of a reliable substitute they will only be able to employ half the number of omnibuses. Sir Albert continued:—"It is only when it is considered how London has grown and developed by means of the new arteries connected up only through the motor omnibus that the importance of the service becomes strikingly manifest. Take the extreme case of the bungalow town at Aperfield Court, near Westerham. The nearest station is seven miles distant. The people there are entirely dependent upon our service. Motor omnibuses are the connecting link between Cranbrook Park and Ilford, and Bromley and Farnborough, where there are so many munition workers. And it must be remembered that there are others who have always looked to the services to save them from being stranded in case of serious railway congestion or breakdown. Coming nearer London, think of the hundreds of thousands waiting to jump on to passing omnibuses! In no city in the world is there such a spectacle."

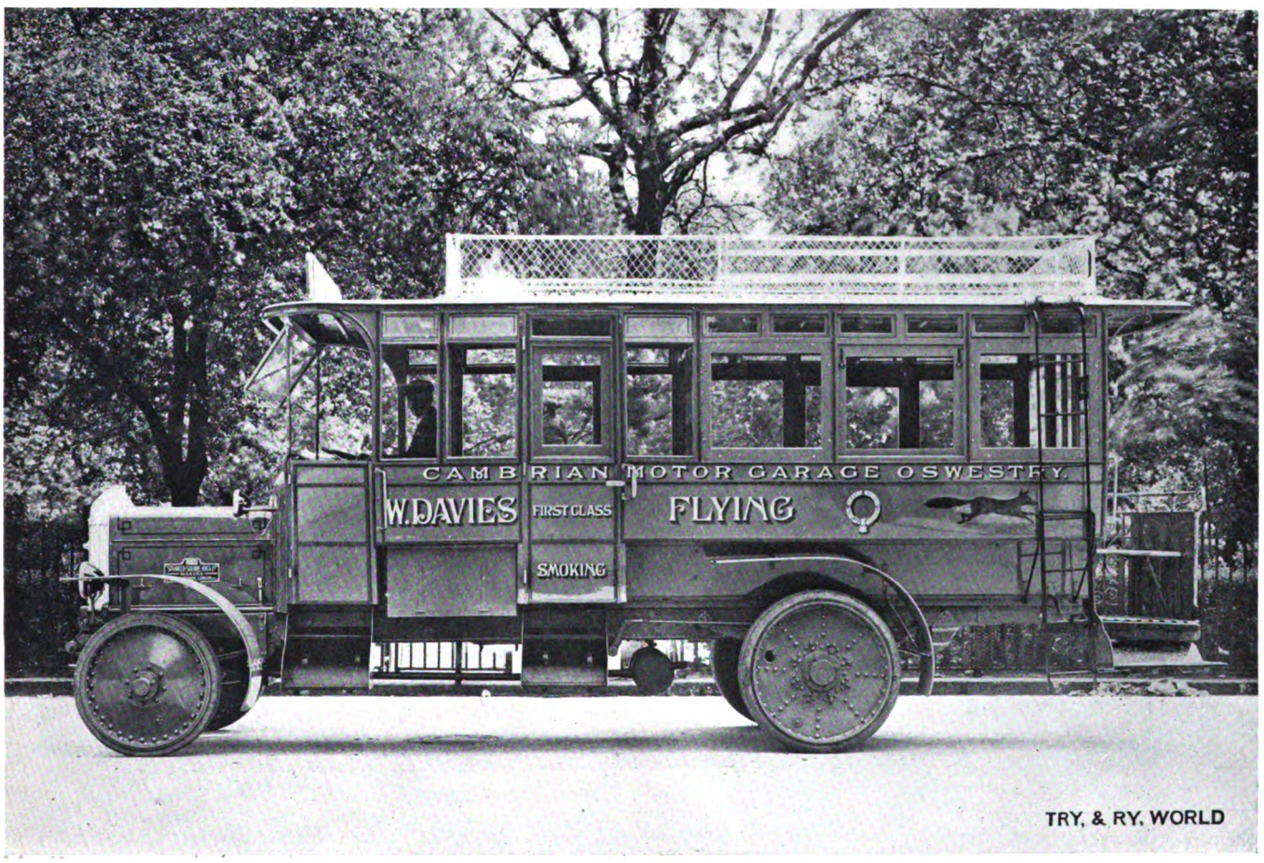
"The most important part of our work from the point of view of the national emergency," said Sir Albert, "is the services in the great munition areas. These services must be the last to suffer, because tens of thousands of war-workers are dependent upon us for taking them to and from their work, a journey of several miles in a great many instances. In Woolwich the demand has been so enormous that a quarter of our entire service has been specially adapted to deal with it. The L.C.C. tramways were quite unable to cope with the sudden expansion of the traffic. We go to any place within seven miles of Woolwich, and there are hundreds of omnibuses carrying these munition workers."

In spite of considerable withdrawals of omnibuses for service in France, the General Company have given greatly increased facilities in the munition areas, and in some cases the services have been trebled. In connection with the country services, on weekdays only 6 per cent. of the vehicles work on country routes, while on Sundays only 8 per cent. operate on routes that are not worked on weekdays.

STRAKER-SQUIRE DELIVERIES.

Omnibuses for Military Use.

By permission of the authorities, Straker-Squire (1913), Limited, were able to deliver a number of single deck omnibuses, which are being used for the conveyance of officers and soldiers from their various camps in Wales and Shropshire. From the accompanying photograph the reader will observe that the body has two compartments, the one in front being for smokers. Each compartment has a separate door, which does away with the objections to smoking that are urged when indulgence is permitted in an undivided saloon. We have before referred to the economical running of single-deck omnibuses manufactured by Straker-Squire, Limited, but it is surprising to find that this characteristic is still apparent when the machine is greatly overloaded. Although the bodywork provides for a seating capacity of 30, this omnibus has been known to carry more than 60 "Tommies," 20 of the number finding places on the luggage grid. The road is much cut up and rough, and there is a six-mile continuous pull, notwithstanding which the driver averages eight to ten miles to the gallon of petrol. This record is the more satisfactory when the fact is remembered that a very heavy and substantial body has been fitted for this special traffic.



Straker-Squire Omnibus in Military Service in Wales and Shropshire.

Electric Vehicle Charging at Ipswich.—The Electric Supply and Tramways Committee's report for the year ended March 31 refers to a new source of revenue in the charging of battery vehicles. There are now four electric vehicles running in the town, the owners being the electric supply department to the borough surveyor's department and the Co-operative Society. Another vehicle for Ipswich is on order with Messrs. Ransomes, Sims and Jefferies.

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MOTOR TRAFFIC.

YORK ELECTRIC OMNIBUSES.

Councillor W. H. Sessions, deputy chairman, York Corporation Tramways, stated at a recent meeting of the Council that there was last year a loss of £450 on the electric omnibuses. After five years they would no longer have to pay sinking fund charges and interest in connection with the purchase of the vehicles, and they would then be able to recoup themselves for any present losses.

Particulars regarding the omnibuses supplied to the *Electric Vehicle* by Mr. J. W. Hame, the general manager and engineer of the tramways, show that there are four omnibuses, which were supplied by Edison Accumulators, Limited, three being in daily service, with the fourth in reserve. During the year the vehicles have covered a mileage of 65,470, the power consumption, after allowing for all losses, averaging 1·23 units per car-mile. Exclusive of interest and sinking fund, the total working costs per 'bus-mile worked out at 4¼d. There has been very little outlay upon tires so far, but Mr. Hame estimates that, allowing for the full tire maintenance cost over a long period, the working costs will average 5¼d. per omnibus-mile, exclusive of standing charges. There has been no trouble whatever with the batteries or electrical equipment, and the vehicles have proved entirely trustworthy. At one terminus a combined charging station and passenger shelter has been provided. A charging cable is drawn up from the roadway box and attached to the accumulator. The driver opens a small door under the observation window of the booster house and presses a button, which starts up the machine, and charging begins.

ELECTRIC VEHICLE COMMITTEE.

At a meeting of the Electric Vehicle Committee in London, Mr. R. A. Chattock presiding, it was announced that the Royal Automobile Club had nominated as their representative upon the Committee Mr. W. Worby Beaumont. Consideration was again given to insurance policies for electric vehicles.

Correspondence with the Car and General Insurance Corporation, Limited, was submitted, from which it appeared that they were willing to come into line with the suggestions previously made by the Committee that their standard electric vehicle policy should be altered so as to include the risk on the battery while the vehicle is in transit by road, rail or ship. Subject to this alteration, the Committee considered that the Car and General Insurance Company's policy met every reasonable requirement, and they decided to give their approval to it.

Arising out of correspondence with the Rugby Urban Council in the matter of providing charging facilities for electric vehicles, the secretary was directed to write and say that the Committee regretted the Council's decision not to provide such facilities at the present time. It should be noted that the British Thomson-Houston Company, Limited, and Messrs. Willans and Robinson, Limited, are prepared, when their own arrangements admit and at times convenient to themselves, to charge electric vehicles passing through Rugby.

The date of the next meeting was fixed for September 29, at 2.45 p.m.

THE IMPORT OF BATTERY VEHICLES.

We have received from the Electric Vehicle Committee a copy of the correspondence between that body and the Board of Trade in respect to the proclamation prohibiting the import of motor vehicles. In the first letter asking that electric battery chassis intended for commercial uses shall be most favourably treated under the licensing arrangements, Mr. F. Ayton, hon. secretary to the committee, advanced eight reasons in support of the request. Among them were the following:—(1) The usual cost of power for operating is approximately equal to petrol at 6d. per gallon; (2) the use of battery vehicles assists in conserving petrol supplies; (3) women or elderly men can very soon become proficient in driving battery vehicles, thus freeing men of military age for service; (4) simplicity and sturdy construction makes repairs a small item at a time when every mechanic is required for munition work; (5) the employment of power stations to produce electricity for charging battery vehicles is bound to improve the load factor as it has already done in Chicago and New York; (6) free importation will create such a demand that there will be some incentive after the war for British manufacturers to establish the building of such vehicles as a staple industry. A reply was received from the Department of Import Restrictions stating that if the Committee would send a statutory declaration that the chassis were to be used solely for commercial purposes the matter of their importation should have consideration.

MOTOR AND PETROL DIVIDENDS.

BRITON MOTOR COMPANY.—The report for the seven months to December 31, 1915, shows a trading profit of £5,162. After allowing for depreciation and other charges, there is a net profit of £3,142. It is proposed to pay a dividend at the rate of 10 per cent. per annum for the seven months, to write off £300 from preliminary expenses, placing £1,000 to reserve, and carrying forward the balance.

SHELL TRANSPORT AND TRADING.—The net profits of the Shell Transport and Trading Company for 1915, including £436,796 brought forward, were £2,164,096. Dividends amounting to 35 per cent. have been declared, leaving £420,302 to be carried forward. The directors recommend the transfer of £100,000 from the profit and loss account to reserve, which will then amount to £4,000,000. The net profits for the past five years and the dividends were as appended:—

	Net profits.	Dividends per annum.	Carried forward.
1915	£1,729,900	... 35 per cent.	... £420,302
1914	1,637,483	... 35 ..	... 436,796
1913	1,535,066	... 35 ..	... 326,564
1912	1,159,113	... 30 ..	... 265,193
1911	626,314	... 20 ..	... 294,985

PETROL SUBSTITUTES.

Under the direction of Mr. G. T. Harrap demonstrations are being given of a new petrol substitute known as Force motor fuel. It is a preparation of paraffin, lighter than crude oil, but it is not a spirit, and therefore is not subject to duty or to the regulations that prevent spirit being stored in the house or garage. The secret lies in the method by which it is given a fixed strengthening for use as a motor fuel. This fuel is said to have stood the test of practical use by the Motorists' Mutual Co-operative Society, a motor cab company, and various other firms.

Some months ago the Government were offered an invention by which a certain powder composition was to have water added in order to become motor spirit. The offer was declined, but Mr. J. Owen, the author of the motoring notes in the *Westminster Gazette*, understands that the invention has gone to France, and that the French Government has appointed a scientific commission to watch the demonstrations on its behalf. The inventor claims to have driven a car of 2,500 lb. weight, carrying six passengers, for an hour, covering 35 miles, and consuming one and a half gallons of the substitute fuel.

BETTER FUEL OUTLOOK AFTER THE WAR.

It may be some consolation for the present restricted supply of fuel to learn that after the war there will be a plentiful supply of benzol, which has hitherto been largely in use by the London General Omnibus Company. Owing to the demands of the Ministry of Munitions, the gas companies all over the country have laid down plant for extracting from the coal the products required for explosives, including benzole from by-product coke ovens. Last year 24,000,000 gallons of benzole was produced in that way, although the demand was not great for war purposes until July of that year. After the war it is expected that the supply can easily be brought up to 50,000,000 gallons annually.

L.G.O. COMPANY'S MINIATURE RIFLE RANGES.—The fifth miniature rifle range erected by the London General Omnibus Company, Limited, for the use of its employees was opened at the Training School, Milman's Street, Chelsea, on August 7. Colonel C. F. Colvile (director) presided, and Lieut.-General Sir A. E. Codrington fired the first shot and declared the range opened. He said that it was probably the finest miniature range he had seen, and would have gratified the heart of the leader of the movement, Lord Roberts. A vote of thanks to General Codrington was proposed by Mr. H. E. Blain, the operating manager, who said that, in addition to the five ranges now open on the company's premises, arrangements had been made at two other ranges for the employees to have facilities, so that range practice could now be obtained in practically every part of London. There were 1,800 members of the rifle club. The vote of thanks was seconded by Mr. G. J. Shave and suitably acknowledged.

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MOTOR TRAFFIC.

MOTOR VEHICLES FOR MUNICIPALITIES.

Erith Urban Council has taken delivery of a 35-40 h.p. turbine motor fire engine from Messrs. Dennis Brothers, Limited.

Glasgow Electricity Committee has adopted a recommendation by the Sub-committee on Works to purchase two 5-ton battery wagons at a total cost of £2,990, orders for one vehicle each to be placed with Edison Accumulators, Limited, and the General Vehicle Company, Limited.

Blackpool Cleansing Department has received delivery of a second battery-propelled water sprinkler. This will enable all the horse-drawn water carts to be withdrawn. During the winter one of the electric sprinklers will be used for carting coke, a wagon body being substituted for the tank.

Hull Council has ordered cabs with wind screens to be fitted to the motor sweepers, the drivers having complained of exposure during rough weather. The War Office having been unable to release a Daimler chassis for use as a motor ambulance, the Health Committee of the Council has been empowered to secure a suitable chassis.

Bristol Corporation has had completely satisfactory experience of two 3-ton steam lorries that were obtained in October and November last from the Yorkshire Commercial Motor Company, at a cost of £1,090. The machines have been used for the cartage of bituminous and other materials required for road construction, and they are fitted with rubber tires, thus enabling them to take advantage of the extended speed limit of 12 miles an hour. In his annual report, Mr. L. S. McKenzie, the city engineer, also refers to another good investment that the Corporation made in August, 1915, by purchasing two petrol-driven Laffly road sweepers. Mr. McKenzie records a net saving of £181 by the two machines for the quarter ended March 31 last, exclusive of repairs and capital charges, and he considers that each sweeper will effect a saving of £160 per annum.

Dover Council has adopted a recommendation made by the deputy borough surveyor for carrying on the collection of house refuse at night when their sixth Edison van is delivered. Mr. Crummalk recommended that refuse collection should start at midnight, thus freeing two of the vehicles for other duties by 6 a.m. The remaining vans would be released by 10 o'clock. One or more of the vans could be adapted for street watering work, and as each vehicle had a capacity equal to that of two horsed watering vans, a saving would be effected of at least 10s. for every pair of horsed carts displaced. If one van were fitted with a machine broom, from four to six sweepers could be dispensed with. The cost of current with an electric vehicle employed in this manner was found slightly to exceed 3d. per street-mile. It was difficult to estimate the saving that could be effected by using the electric vehicles for emptying catchpits, but one electric would displace two or three horsed vehicles, which at present cost from 23s. to 35s. per day, according to the number that was hired by the department. He estimates a total saving by the rearranged scheme of work of between £500 and £700 per annum. With three Edison vans working over a period of about eight months the cost of refuse collection per ton worked out at 4s. 10·21d. as compared with 6s. 2d. with horsed refuse carts, the electrics dealing with 5,201 tons of refuse.

BUSINESS ITEMS.

Ferodo Fabrics.—A remarkable feature about Ferodo fabrics is their adaptability. Although designed originally for lining clutches and brakes, their high co-efficient of friction results in their being used in many ways. The latest instance comes from a firm who are extensively engaged on munitions. They are using Ferodo fibre in a circular vice for holding the shells whilst screwing in the noses, and they inform the makers that it gives good results, as it does not mark the work and has a remarkable gripping power. The manufacturers of Ferodo fabrics, the Herbert Frood Company, Limited, Chapel-en-le-Frith, are at all times ready to give advice in regard to the use of their fabrics, and welcome inquiries.

Messrs. W. T. Henley's Telegraph Works Company, Limited, the well-known manufacturers of Henley solid band tires, owing to the great increase in their solid tire business in Scotland, have recently opened a depot adjacent to their Glasgow branch office to deal with solid tire business only. A large stock of solid tires in all sizes is held here, and they have installed one of Hollings and Guest's latest type of hydraulic tire presses, enabling solid tires to be fitted without delay. The company have also published a booklet upon the abnormal wear of solid tires, and they will be pleased to send one to any user of solid tires. One of its features is a compendium of extracts from various technical publications giving disinterested advice as to how to obtain the best mileage from solid tires.

Spencer-Moulton Tires.—The popularity of the motor and other vehicle solid rubber tire produced by George Spencer Moulton and Company at Kingston Mills, Bradford-on-Avon, should be widely extended among municipal and other users as the result of the issue of the company's new catalogue, No. 101. To say that every owner and driver stands to gain by perusing the information given therein is no exaggeration. One of the novelties is a dozen cut-outs showing the exact sizes of a section of each tire (European sizes in millimetres and American in inches), so that the user can judge instantly and accurately what will suit his needs, according to whether his vehicle is British or American. Owners of steam and horsed vehicles shod with steel tires will be interested in a page that contains reasons why rubber tires should be substituted. The attention of employees who have charge of motor vehicles can be profitably directed to a page of hints for the treatment of rubber tires, which it is interesting to note were made by this firm for railway companies over forty-four years ago. Spencer-Moulton tires are the result of more than sixty years' experience in rubber manufacture. Under the management of Mr. Leo Swain at the head office, 239, Deansgate, Manchester, George Spencer Moulton and Company have met the demands of the commercial community by opening offices or agencies in the chief provincial centres, where hydraulic presses have been installed in order that replacements may be rapidly and efficiently handled.

DAIMLERS AT ST. HELENS.

While body design on the majority of double deck omnibuses has shown little or no improvement, the single deck body has become as attractive as a first-class railway saloon. One of the principal firms of body builders who have been responsible for this advance is Messrs. E. and H. Hora, of Peckham, London, whose work has contributed in no small measure to the popularity of public service motor vehicles. Especially is this so in the provinces, where patrons of motor traction enjoy a degree of comfort that is denied to the

The Eighth Daimler in the Service of the County Carriers.

inhabitants of the metropolis. When a single-deck body is combined with a Daimler chassis the acme of luxurious travelling may be said to be reached, as a glance at the subjoined photograph will indicate. The vehicle there shown is operated by the St. Helens and District Motor Services of the County Carriers. The Daimler chassis is a 3-ton machine, and it has been supplied by permission of the War Department. This is the eighth Daimler chassis purchased by the County Carriers, who have furnished highly satisfactory reports of their performances. One chassis completed 52,000 miles before any attention was required by the engine. Another was looked over as a precautionary measure after it had covered 42,000 miles, and it then ran 8,000 miles before any attention was needed. To date, a third Daimler has totalled 32,000 miles, and the owners state that it "will apparently do many more before it is necessary to dismantle it." They add: "The Daimler is far and away the most economical vehicle in the service, and its extremely silent and smooth running make it the ideal for public service work."

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MOTOR TRAFFIC.

WARRINGTON CORPORATION OMNIBUS COSTS.

Mr. J. Telfer, general manager of Warrington Corporation Tramways, has issued the accounts of the motor omnibus department for the year ended March 31, 1916. From the appended comparative table it will be seen that the past year's results indicate an improvement. It would appear that the fare of 1d. is too low a figure for one of the routes.

	1915-16. Amount.	1915-16. Average per mile run.	1914-15. Amount.	1914-15. Average per mile run.
EXPENDITURE.				
To Traffic Expenses —	£ s. d.	d.	£	d.
Motormen and Conductors' wages	775 16 10	2·407	734	2·233
Cleaning and oiling	148 16 9	·462	127	·386
Lighting	55 9 2	·172	42	·127
Fuel, light, and water for garage	7 10 0	·023	7	·023
Ticket check	17 9 0	·054	6	·019
Uniforms and badges	—	-	7	·020
Licenses	13 9 0	·042	14	·042
Miscellaneous	0 3 11	—	—	—
	1,018 14 8	3·160	937	2·850
To General Expenses—				
Rents	20 0 0	·062	22	·066
Printing and stationery	8 1 2	·025	9	·028
Accident insurance and compensation	134 8 3	·417	143	·434
Fire and other insurances	25 4 4	·078	15	·046
Miscellaneous	10 13 10	·033	5	·016
	198 7 7	·615	194	·590
To General Repairs and Maintenance—				
Buildings and fixtures	19 5 3	·059	105	·321
Workshop tools and plant	5 3 8	·016	5	·014
Omnibuses—Chassis	495 12 5	1·537	342	1·040
,, Tires	324 7 10	1·006	354	1·078
,, Bodies and fittings	21 9 5	·068	20	·061
	865 18 7	2·686	826	2·514
To Power Expenses—				
Cost of petrol	777 16 0	2·413	824	2·506
	2,860 16 10	8·874	2,782	8·460
To allowances to employees serving in H.M. Forces	49 6 3	·153	44	·135
	2,910 3 1	9·027	2,826	8·595
Balance to net revenue	219 0 2	·679	56	·171
	3,129 3 3	9·706	2,882	8·766
INCOME.				
By traffic revenue	3,127 5 4	9·700	2,879	8·757
,, sundry revenue	1 17 11	·006	3	·009
	3,129 3 3	9·706	2,882	8·766

NET REVENUE ACCOUNT.

EXPENDITURE.	£ s. d.	d.	£	d.
To interest on loans	64 0 2	·199	86	·262
,, contribution to sinking fund	551 2 2	1·709	537	1·633
,, bank interest	0 3 4	—	—	—
	£615 5 10	1·908	£623	1·895
INCOME.				
By revenue account	219 0 2	·679	56	·171
,, bank interest	—	—	13	·038
,, balance, being net loss for the year	396 5 8	1·229	554	1·686
	£615 5 10	1·908	£623	1·895

APPROPRIATION ACCOUNT.

EXPENDITURE.	£ s. d.
Balance, April 1, 1915	217 19 6
Net revenue account, net loss for year	396 5 8
	£614 5 2
INCOME.	
Borough rate, for deficiency, 1914–15	217 19 6
Balance at debit, March 31, 1916	396 5 8
	£614 5 2

	1915-16.	1914-15
Total borrowing powers	£5,000	£5,000
Gross capital expenditure	£2,837	£2,837
Length of routes :—	miles.	miles.
Gorsey Lane	1·250	1·250
Bewsey Circular	2·375	2·375
Traffic revenue	£3,127	£2,879
Total revenue	£3,129	£2,895
Working expenses	£2,910	£2,826
War allowances to employees	£49	£44
Interest and sinking fund	£615	£623
Net balance (loss)	£396	£554
Omnibus miles	77371·5	78913·6
Passengers (contracts estimated)	846,883	771,510
Gallons of petrol consumed	14,632	15,523
Cost of petrol per omnibus mile	2·413d.	2·506d.
Average number of omnibuses in use	2	2
Percentage of working expenses to receipts	93·001	97·616
Avg. traffic revenue per mile	9·7d.	8·757d.
total revenue per mile	9·706d.	8·804d.
miles per day per omnibus	110·679	108·1
omnibus hours per day per omnibus	15·716	15·716
working expenses per mile, excluding petrol	6·614d.	6·089d.
working expenses per mile, including petrol	9·027d.	8·595d,
Fares—Adults 1d.; children ½d.		
Avg. fare per passenger	·886d.	·895d.
Avg. number of passengers per mile	10·946	9·7
Number of omnibuses	3	3

Type of omnibus 40 H.P. two-deck, petrol-electric.
Seating capacity per omnibus 34.

A HALLEY W.D. LORRY WINS A PRIZE.

The Halley W.D. lorry shown in the accompanying illustration recently took the first place in a competition somewhere in France. The points on which the award was based were (1) length of time

on active service; (2) behaviour; and (3) the amount of repairs done to the lorry during the period of service. A large number of lorries of various well-known makes were, we understand, among the competitors.

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MOTOR TRAFFIC.

MUNICIPAL USE OF STEAM TRACTORS.

PORTSMOUTH'S GREAT SAVING OVER HORSE HAULAGE.

Following the discussion on steam tractors at the annual conference of the Institute of Cleansing Superintendents at Cardiff in July, Mr. H. Hopkinson, cleansing superintendent at Portsmouth, has submitted the appended comparison of steam and horse traction for cleansing work by the Corporation of Portsmouth :—

COST OF COLLECTION OF HOUSE AND BARRACK REFUSE BY STEAM MOTOR ("FODEN") WAGON AND TRAILER.

Carrying capacity of wagon attached to motor	...	11½ cub. yds.
,, ,, trailer ,, ,,	...	11 ,,
		22½ ,,
Weight per load of		
Wagon ... ... 3 cub. yards per ton	...	3 tons 13 cwts. 1 qr.
Trailer ... ... 3 ,, ,,	...	3 ,, 13 ,, 1 ,,
		7 ,, 6 ,, 2 ,,
2 loads per day of both wagon and trailer	...	14 tons 13 cwts.
Cost ,, ,, ,, ,,	...	Fuel, etc. 4s. 7½d.
		Wages 8s. 4d.
		Total 12s. 11½d.
14 tons 13 cwts., or 44 cub. yards, cost	... ...	12s. 11½d.
1 ton ,, 3 ,, ,,	... ...	10½d.
6 cwts. 2 qrs. ,, 1 ,, ,,	... ...	3½d.

COST OF HOUSE & BARRACK REFUSE COLLECTION BY HORSE & CART.

Carrying capacity of ash cart	4 cub. yards
Weight per load of ash cart (average)	1 ton 6 cwts.
Average No. of loads per horse—2½ per day =	3 tons 5 cwts.
Cost per day for one day's work	10s. 4d.

Therefore :

45 horses collect 112½ loads, or 450 cub. yards, average weight, 146 tons 5 cwts., costing ...	£23 5s. 0d.
1 horse will collect 2½ loads, or 10 cub. yards, average weight, 3 tons 5 cwts., costing	10s. 4d.
1 horse will collect 1 load, or 4 cub. yards, average weight, 1 ton 6 cwts., costing	4s. 1d.
1 horse will collect ¼ load, or 1 cub. yard, average weight, 6 cwts. 2 qrs., costing	1s. 0¼d.
3 cub. yards, average weight, 1 ton, costing ...	3s. 0¾d.

So it will be seen by the above that the cost of haulage by motor is 2s. 2¼d. less per ton (3 cub. yards), or 9½d. less per cub. yard (6 cwts. 2 qrs.).

HORSE.

	Loads.	Cub. yards.	Weighing. Tons	cwts.	Costing. £	s.	d.
In 1 day 1 horse collects	2½ or	10	3	5	0	10	4
In 1 week 1 ,, ,,	15 or	60	19	10	3	2	0
In 1 year 1 ,, ,,	780 or	3,120	1,014	0	161	4	0

MOTOR AND TRAILER.

	Loads.	Cub. yards.	Weighing. Tons	cwts.	Costing. £	s.	d.
In 1 day 1 motor and trailer collects ...	2 or	44	14	13	0	12	11½
In 1 week 1 motor and trailer collects ...	12 or	264	87	18	3	17	9
In 1 year 1 motor and trailer collects ...	624 or	13,728	4,570	16	202	3	0

GLASGOW TO LONDON BY MOTOR.

The Albion Motor Car Company, Limited, are under contract with the War Department to despatch each week to London by road a number of motor lorries. There is accommodation for two persons besides the driver on each vehicle, and to assist the respective war funds the Albion Company are agreeable to allow a limited number of men who may desire the experience of travelling to London by road to do so by their motor vehicles. The Albion Company will make no charge for the trip, but each person travelling will require to subscribe the sum of 10s. to one of the war funds, as named by the Albion Company. The journey usually takes four days (three nights in hotels), and all passengers will require to make their own arrangements for food and hotel accommodation *en route*. The fleets leave Glasgow approximately every Tuesday and Friday. Persons desirous of securing seats or obtaining further particulars should apply to the Albion Motor Car Company, Limited, 105, St. Vincent Street, Glasgow.

MOTOR TRAFFIC NOTES.

HULL MOTOR PARCELS SERVICE.—A motor parcels delivery service has been instituted in Hull and district by the Hull Motor Transport Company.

MOTOR TRANSPORT IN BENGAL.—The Eastern Transport Company have established motor services between a number of towns in Bengal, special attention being given to railway connections.

OMNIBUS PARCEL SERVICE BETWEEN ALDERSHOT AND READING.—The Tramways Committee at Reading have completed an agreement with the Aldershot and District Traction Company, Limited, for the reception and forwarding of parcels between those towns and intervening places.

OMNIBUS RESTRICTIONS AT OLDHAM.—With a view to arranging for the curtailment of the motor omnibus services of Oldham Corporation Tramways department, a census has been taken of the passengers. Petrol can be obtained only for services necessary to the carrying on of war work.

CONVEYANCE OF MUNITION WORKERS.—In order to conserve the petrol supply and so meet the increased demand for transport for munition workers, the Birmingham Tramways department has withdrawn a number of motor omnibuses from the Harbourne suburban route between 5 p.m. and 8 p.m.

2-Ton Halley Lorry at Work in Wrexham.

MOTOR VEHICLES' HARVEST DURING A TRAMWAY STRIKE.—On the occasion of the recent strike of tramway employees in New York, sight-seeing automobiles and hundreds of small motor cars were utilised along the tramway streets. The fare was 5d. per ride, which was twice the ordinary car charge.

A SURVEYOR'S PETROL LICENCE.—Only six gallons of petrol for 13 weeks' use of a motor cycle had been allowed by the Petrol Control Committee to the surveyor of the East Preston (Sussex) Rural Council. The Council had supported an application for an allowance of 18 gallons, in order that the officer may be able to properly supervise his men and their work.

OMNIBUS LICENSING AT READING.—In a report recently presented to the Watch Committee of Reading, the chief constable supported the granting of licenses for motor omnibuses linking up surrounding districts with the town. The vehicles, he added, were a great source of revenue to the trade of the town, and did not interfere with the working of the tramway service.

ALTERNATIVE USE FOR CHARS-A-BANCS.—The Askern Coal and Iron Company, Doncaster, have advertised for tenders from owners of motor chars-a-bancs for the conveyance of miners (munition workers) between the Angel and Royal Hotel, Doncaster, and the Askern main colliery, picking up miners *en route*. The double journey to take place three times per 24 hours, from Sunday night until Saturday mid-day. The company offers "to guarantee the cost of the same."

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MOTOR TRAFFIC.

EDISON TOWER WAGON AT SOUTHAMPTON.—The Edison accumulator tower wagon which was purchased in September, 1915, by Southampton Corporation Tramways Committee at a cost of £715, enabled the department to dispense immediately with two horses. The cost of maintenance, as was anticipated, has so far been negligible, the only expense being the cost of energy. It has been found a great advantage to have the electric light available for night repairs, even though the current be off the trolley wire.

EFFECT OF THE PETROL SHORTAGE.—An indication of the great restriction of motor traffic effected by the petrol licence system is to be seen in London not only by the reduction of the number of omnibuses in service but by the disappearance of hundreds of private motor cars. The latter effect is particularly noticeable in the number travelling to and from the city. At certain hours in the morning and evening there was a constant procession of such vehicles along the Victoria Embankment, but it is now an easy matter for a pedestrian to cross the road even at the busiest period. It is remarked that at Bristol many business men have given up their cars and have returned to the railway, or are using the tramcars and omnibuses.

HURRICANE LAMPS ON MOTOR VEHICLES.—The Commercial Motor Users' Association recently appealed to the Home Office concerning the action of certain police authorities in construing Regulation A of the Defence of the Realm Regulations, affecting the use of movable lamps on highways. The Association is now officially notified, for the guidance of users of steam-propelled vehicles, more particularly that "whilst the Secretary of State has no authority to give a binding decision on a question of law, he believes the Regulation was not intended to prevent the use of such lamps on lorries or similar vehicles." It is understood that the Regulation was aimed at swivelling lamps, and that hurricane lamps using paraffin are not to be regarded as coming under it.

THE GIRL CONDUCTORS ON LONDON OMNIBUSES.—On the completion of six months' service by the girl conductors on the London omnibuses, a correspondent has been gathering their impressions of the work. The girls state that if they can stand the first few days, they become used to the swing and jolting and can adapt themselves to it without undue fatigue, finding it less tiring to move about than to sit down. One country girl who had been too timid to ride on top of an omnibus when she first came to London, spoke delightedly of her work, especially on country routes, and other girls said they enjoyed every minute of their days. As far as the greater part of the year was concerned, they said, omnibus conducting was emphatically work for women.

MOTOR VEHICLE CONTRACTS.

Clayton and Shuttleworth, Limited, of Lincoln, are supplying portable steam engines to the War Department.

The Motor Rail and Tramcar Company, Limited, have supplied a number of petrol tractors to the War Department.

D. Napier and Son, Limited, Acton, W., obtained a contract for the supply of motor lorries in recent monthly contracts called for by the War Office.

Ford Motor Company (England), Limited, Ansdell Street, Kensington, W., have a contract to supply a number of motor delivery vans to the War Office.

Straker and Squire (1913), Limited, Blackfriars, London, S.E., Twickenham, and Bristol, have a contract for supplying motor chassis and parts to the War Department.

The War Office have placed contracts with the Austin Motor Company (Birmingham), and with the Standard Motor Company, Limited (Coventry), for the supply of petrol engines.

THE INSTITUTION OF AUTOMOBILE ENGINEERS.

The first meeting of the session of the Institution of Automobile Engineers will be held on Wednesday, October 11, 1916, in the Hall of the Royal Society of Arts, John Street, Adelphi, W.C., at 8 p.m., when the president, Mr. L. A. Legros, M.Inst.C.E., will deliver his presidential address. The address will contain, among other things, a valuable collection of data in reference to torque curves of internal combustion engines. Cards of invitation to the meeting may be obtained on application to the secretary of the Institution, 28, Victoria Street, Westminster, S.W. It is hoped that this year it will be possible to arrange for the full number of meetings, but meantime the Institution is engaged on much important work in connection with research and standardisation, the results of which should be available for the members before the end of the session.

"ACTUAL EXPERIENCE."

In more ways than one a 16-page illustrated catalogue issued by the Daimler Company, Limited, Coventry, should effectively answer the purpose for which it has been issued. It bears the above title by virtue of containing letters received from more than a score of users of the Daimler vehicles. Their machines include omnibuses, chars-a-bancs, lorries, vans, brewers' drays, etc., and in every instance the fine work of the Daimler engine and chassis has led the drivers to voice their merits. Two features of the sleeve-valve engine are its silent operation and that it needs no attention beyond oiling for a minimum of 20,000 miles. Despite inferior road surfaces in many places, the Daimler proves as efficient in the provinces as it did in London when the licensing authorities imposed severe restrictions on the noisy omnibuses that raced through the streets in the days of the competing companies. One of the best testimonials is contained in the following extract from a letter received from the Cleveland Motor Service, Limited:—"Since June 1 last we have been driven, owing to War Office demands, to provide a three-omnibus service with a single omnibus. The route is over 15 miles each way, with four or five journeys per day—Sundays and week-days—120 to 150 miles per day. During the whole time we have only missed three journeys, these owing to carelessly tightened nuts in the leather couplings. Otherwise we should have performed the whole of the 26,000 miles without a break or hitch. The chassis and engine have been a revelation in mechanics—hence our further orders." Chars-a-banc owners refer to a 28-seat vehicle being as easy to drive as any small car, and as traversing for three months continuously weekly journeys averaging from 600 to 700 miles per week without the semblance of a breakdown. Blackpool, St. Annes, and Lytham Tramways Company write:—"We have a good lot of competition in this district with motor vehicles, but the Daimler, without a doubt, is the favourite with the people. The chars-a-banc proved very satisfactory for our long runs—tours to the Lakes being very popular—and not once have we had a breakdown." The owner of a lorry speaks of carrying 2½-ton loads on very rough roads, doing the work of six horses impressed by the military authorities. The Daimler among other machines has stood the test of the war, and local authorities and firms desiring to place orders for future execution will find the publication worthy of perusal.

NEW THORNYCROFT CATALOGUE.

John I. Thornycroft and Company, Limited, Caxton House, Westminster, Southampton, and Basingstoke, have issued a new and enlarged commercial vehicle catalogue. It comprises forty pages, and contains full particulars of the various types which the company will be building when they are permitted by the Government to recommence private work. At present they are required to supply their entire output of vehicles, consisting temporarily of 40 H.P. type "J" lorries, to the War Office for military purposes. Several new features have been introduced into the catalogue, including coloured illustrations of the vehicles just mentioned and of the 40 H.P. type "G" 5-ton lorry, and a set of useful coachbuilders' drawings. In other respects the catalogue has been enlarged and brought up to date, and a useful index has been added. A perusal of the publication shows that the company are listing models to carry useful loads of from 25 cwt. to 5 tons. The type "X" model, particulars of which are given on pages 24 and 25, is a new one for which they anticipate a large sale later on. With certain modifications to suit the special conditions under which the vehicles have to run, this model has been adopted by the Government of India on the recommendation of Lord Montagu of Beaulieu for military work in the East. Type "X" comprises 40 H.P. worm-driven chassis for 3 and 4 ton loads in an open lorry body, or 2½ and 3½ tons in a van body. As the catalogue has been in the printers' hands for some time, and as the cost of labour and material is constantly rising, the running cost tables contained on pages 10 and 11 now require some modification. Under present conditions it is impossible to print accurate running cost tables, but the company believe it will be found that their running cost tables approximate much more closely to actual running conditions than is the case with the figures published in some other quarters.

MOTOR LORRIES SUPPLEMENTING A RUSSIAN RAILWAY.—A message from Petrograd on August 27 stated that a complete service of motor cars has been started between Petrograd and Archangel to supplement the railway. The road, over 600 miles in length, has been newly constructed for the purpose. The cars, mostly heavy lorries, were supplied from the United States.

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THE

Tramway & Railway World

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ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."

Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

PORTSMOUTH CORPORATION TRAMWAYS.

CONTRACT.

The Tramways Committee invite tenders for the supply and delivery of:—

Women Conductors' Uniform Overcoats.
" " " Mackintoshes.
" " " Leather Leggings.

Specification and conditions, and form of tender may be obtained, and samples may be seen, on application to the General Manager, Town Hall, Portsmouth.

Sealed tenders, endorsed "Tenders for Uniform Overcoats," Mackintoshes or Leather Leggings, as the case may be, to be delivered to the undersigned at the Town Hall, Portsmouth, not later than 12 noon, Monday, September 25, 1916.

The Committee do not undertake to accept the lowest or any tender, and reserve the right to accept the whole or any portion of the tender.

W. R. SPAVEN,
General Manager.

Town Hall, Portsmouth.
September 15, 1916.

CITY OF MELBOURNE, AUSTRALIA.

SUPPLY OF INSULATED COPPER CABLES.

Tenders are invited for the supply of:—

1,640	yards	1.25	sq. in.	Single-Conductor	Lead-Covered Cable.
1,200	"	1.0	"	"	"
200	"	0.5	"	"	"
4,352	"	0.3	"	"	"
3,880	"	0.25	"	"	"
1,856	"	0.15	"	"	"
440	"	19/16 S.W.G.	"	"	"
2,000	"	7/14	"	"	"
1,600	"	7/16	" concentric	"	"
1,760	"	0.007	sq. in. 3 core	"	"
400	"	0.05	"	"	"

Specification, tender form, etc., can be obtained on application to the undersigned. Such application must be accompanied by a deposit of 5s., which will be returned on receipt of a bona fide tender.

Tenders to be sent to the undersigned, endorsed "Tender for Insulated Copper Cables," and must be received by them not later than 12 noon on Friday, September 29, 1916.

The Council reserves to itself the right, but does not bind itself, to accept the whole or any portion of any tender.

McILWRAITH, McEACHARN & Co., PPTY
Agents for the Melbourne City Council.
Billiter Square Buildings, London, E.C.

COUNTY BOROUGH OF SOUTHEND-ON-SEA.

The Corporation of Southend-on-Sea require the following for Tramway Conductors. Tenders to be delivered on or before 20th instant:—

45 oilskins for men.
14 waterproofs for women.
31 great-coats for women.

Full particulars to be obtained from Robert Birkett, Borough Electrical Engineer and General Manager, London Road.

THE GREAT INDIAN PENINSULA RAILWAY COMPANY.

The directors are prepared to receive tenders for the supply of the following Stores, namely:—

Wheels and axles for wagons.
Steel tires, etc., for carriages and wagons.
Tire retaining rings, bolts, and nuts.

Specifications and forms of tender may be obtained at this office on payment of the fee for the specification, which payment will not be returned.

Tenders must be delivered in separate envelope, sealed and addressed to the undersigned, marked "Tender for Wheels and Axles," or as the case may be, not later than 11 o'clock a.m. on Thursday, September 21, 1916.

The directors do not bind themselves to accept the lowest or any tender.

R. H. WALPOLE,
Secretary.

Company's Offices, 48, Copthall Avenue, London, E.C.
September 13, 1916.

CITY OF MELBOURNE, AUSTRALIA.

SUPPLY OF BARE HARD-DRAWN COPPER CABLES.

Tenders are invited for the supply of:—

1	ton	7.16 S.W.G.	Cable.
2	tons	19.16	" "
3	"	19.083	" "
4	"	19.101	" "

Specification, tender form, etc., can be obtained on application to the undersigned. Such application must be accompanied by a deposit of 5s., which will be returned on receipt of a bona fide tender.

Tenders to be sent to the undersigned, endorsed "Tender for Bare Hard-drawn Copper Cables," and must be received by them not later than noon on Friday, September 29, 1916.

The Council reserves to itself the right, but does not bind itself, to accept the whole or any portion of any tender.

McILWRAITH, McEACHARN & Co., PPTY., LTD.,
Agents for the Melbourne City Council.
Billiter Square Buildings, London, E.C.

GREAT NORTHERN RAILWAY COMPANY (IRELAND).

TO MANUFACTURERS OF SWITCHES AND CROSSINGS.

The Directors are prepared to receive tenders for the supply of Switches and Built Crossings and Chairs for same.

Copies of the drawings and specification may be obtained from the undersigned on payment of two guineas, which will be refunded on receipt of a bona fide tender and the return of the drawings.

Tenders, made out on forms supplied by the Company, should be delivered, under sealed cover, endorsed "Tender for Switches and Crossings," to the undersigned not later than 10 a.m. on Monday, September 25, 1916.

The Directors do not bind themselves to accept the lowest or any tender.

T. MORRISON,
Secretary.

Secretary's Office,
Amiens Street Terminus,
Dublin, August 25, 1916.

POSITIONS VACANT.

ARMATURE WINDER.

Armature winder; man used to traction motors and having experience of car repair work. Call or write, stating wages required, to H. P. STOKES, Tramways Depot, Bexley Heath.

SWITCHBOARD ATTENDANT.

Switchboard Attendant wanted, ineligible, for duration of war. Wages 30s. per week, war bonus 4s., if married. D.C. generators and A.C. conversion plant in use. Applications to

Borough Electrical Engineer,
St. Peter's Chambers, Glebe Street,
Stoke-on-Trent.

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MUNICIPAL TRAMWAYS ASSOCIATION.

ANNUAL CONFERENCE.

The annual conference of the Municipal Tramways Association (Incorporated) will be held, as announced in our issue of July 15, at the Surveyors' Institute, Great George Street, London, S.W., on Thursday and Friday, September 21 and 22. The programme is as follows:—

THURSDAY, SEPTEMBER 21.

10.45 a.m.—Meeting of the Executive Council.

11. 0 a.m.—Presidential address by Mr. P. Fisher, general manager of Dundee Corporation Tramways.
Paper—"Some Notes on Passenger Transportation in Large Cities," by Mr. J. M. McElroy, general manager, Manchester Corporation Tramways.

1. 0 p.m.—Interval.

2. 0 p.m.—Paper—"Utilisation of Tramways for Goods Traffic," by Messrs. G. W. Holford, general manager, Salford Corporation Tramways, and W. Clough, general manager, Bury Corporation Tramways.

FRIDAY, SEPTEMBER 22.

10.30 a.m. Meeting of the Executive Council.

10.45 a.m. Meeting of Managers' Section.

11. 0 a.m. Annual General Meeting.

As was the case last year, no social functions will take place in connection with the conference, and the usual Association dinner will be omitted. St. Ermin's Hotel, Westminster, S.W., has been selected as headquarters.

Communications should be addressed to the Hon. Secretary, Municipal Tramways Association, 7, Hall Ings, Bradford (Telegrams: "Tramways, Bradford").

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THE
Tramway AND Railway World

Established in 1892 and Published by
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FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, SEPTEMBER 16, 1916.

FORTY PER CENT. OF INCOME TO LABOUR.

In the course of the discussion on the question of raising fares to meet increased expenses due to the war at last year's Municipal Tramways Conference, the speakers agreed that the bonuses now paid to employees were intended to cease with the termination of the war. Several delegates questioned whether it would be possible to drop these payments. Doubtless the determining factor will be whether food prices fall to a level corresponding to the rise, to meet which the bonuses were given. Increased interest is imparted to the subject by reason of a statement and analysis embodied in the annual report of Bradford Tramways Committee. Mr. C. J. Spencer submits a table showing the percentage of the cost of labour to gross revenue since 1909. The cost has risen to 40 per cent. of the total income and 54 per cent. of the total expenditure. The general manager adds that "this is due to natural increases of wages that have taken place from time to time, including war bonuses granted by the City Council to meet increased cost of living, etc., and allowances to dependants of employees serving with the colours, coupled with the increasing amount paid in respect of sickness benefit, which does not figure as a rule as wages. This benefit amounts to £3,700, and in contributions of £660, a total of £4,360, or 3½ per cent. of the wages bill." For this payment no direct service is rendered by the employees, and the manager asks the committee, not for the first time, if they consider it is wise to pay full wages for six weeks' sickness per annum, having regard to the results of the policy. As a recent example, there is a reference to the cost of car cleaning and oiling having increased by £1,706, which was due in part to the standard of labour being lower, with a consequent increase in the pay for sickness. Whether it is prudent for the committee to pay full wages in sickness in these days when providence will enable an employee to secure as much as 18s. per week from national and private sick benefit insurance combined is a matter for consideration. If the system is continued, it would be reasonable to ask that it should be separated from tramways finance and made applicable to the whole of the municipal departments. No intimation is given of the number of years that these sickness payments have been made, so that no good purpose is to be gained by deducting the amount from each year of the table of percentage of wages to expenditure and revenue. The table begins with the year 1909, when the percentage of wages to revenue was 33, and to total expenditure 47. It is advisable, however, to deduct the amount paid for allowances to dependants of soldiers for the past year. Roughly this would seem to be equal to 6 per cent., which would bring the percentage of wages to total revenue down to 34. The increase of 1 per cent. contrasts with a fall in the average fare per passenger from 1.165*d.* in 1909 to 1.047*d.* The latter is low enough to induce the committee to be exceedingly careful in carrying out the decision they arrived at some time ago to consider the question of revising (which generally means lengthening) fare stages after the war. Further ground for caution is given in Mr. Spencer's statement that if the receipts during the past year had been the same per car mile as the average of the previous five years in peace time, there would have been a loss of nearly ½*d.* per mile, which is equal to a sum of £12,000. If the committee need a further warning it is to be found in a study of the page devoted to "financial statistics." This shows that only £4,537 was placed to reserve and renewals account as compared with £14,610 in 1914-15, while the expenditure on renewals was but £8,314 as contrasted with £22,300 for the preceding twelve months.

MUNICIPAL TRAMWAYS AND THE WAR.

We have received from Mr. C. J. Spencer, hon. secretary to the Municipal Tramways Association, the printed statistics compiled from the answers forwarded to the following queries:—Allowances to dependants, war bonus, enlistments, employment of women, auxiliary drivers, etc. The 88 tramway undertakings that furnished returns are given in alphabetical order, and the information is in tabular form in thirteen columns, so that it can be seen at a glance. A summary of the replies is given on the last page as appended:—

Number of towns replying to queries	88
Number of towns certified under Munitions Act ...	44
Number of employees at normal times...	55,208
Number of men who have joined H.M. Forces ...	20,905
Percentage to total	38
*Number of men who have joined munition factories ...	1,893
*Percentage to total	3½
Amount paid to dependants of employees	£854,640
Average allowance per man per week	10s. 7¼*d.*
*Collected on cars for national and other objects ...	£43,800
*Collected and contributed by employees to relief funds	£36,070
Number of women conductors	8,433
Number of women drivers	176
Number of auxiliary drivers	320

* These figures are approximate. The returns are dated August, 1916.

L.G.O. CINEMA FOR SCHOOLS.

A representative of the London General Omnibus Company informed the coroner at Tottenham that the company had engaged a special staff to point out to children the dangers of the streets, and intended shortly to send lecturers to the schools to illustrate with cinematograph films how these risks could be avoided. This statement was made at an inquiry into the death of a child who was killed in a street accident. The announcement will not come as a surprise to the many members of the Tramways and Light Railways Association who visited the L.G.O. Company's training school on the occasion of the annual congress in June last. Mr. H. E. Blain, the operating manager of the company, then explained the work that had been carried out in connection with the "Safety First" campaign, and gave statistics showing that since 1910 it had reduced the number of accidents by 68 per cent. That figure has been a constantly improving one each year, and there are now only 2.15 accidents per 10,000 miles run for the whole fleet of omnibuses. By means of an exhibition of films of reconstructed accidents and of correct and incorrect methods of employees' work, Mr. Blain enabled his auditors to appreciate what a great part the moving picture film has played towards bringing about a reduction in the accident rate. Another contributory cause was the distribution of "Safety First" literature in the elementary schools. The latest films reproduce representations of every type of accident that has occurred on omnibus routes during the past two years, and it is these that are going to be exhibited in the schools. Free use of the films is also offered to the proprietors of picture theatres in London. Among the older pictures are several showing unsafe methods of working omnibuses on tramway routes of the London Traffic Group.

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TRAFFIC DIFFICULTIES.

In consequence of complaints by conductors that the restricted internal lighting of the Glasgow cars prevented them from punching tickets in the right places, and also that they were occasionally imposed upon by the passing of bad or foreign coins, the chief constable has allowed several cars to be experimentally fitted with brighter lights. The concession is approved on the ground that the department can easily switch off the whole electric current within a few minutes. Since Mr. Dalrymple, the manager, proposed to curtail the tramway service by an hour on account of the restricted street lighting and the pressure on the employees, a considerable number of women have been added to the staff as conductors. While many more are required, it is hoped that the department will be able to maintain the present service.

Instead of painting the windows of the Dundee cars down to within a few inches of the foot, the management has now left a margin of clear glass in the centre. As the result of inquiries in other towns some of the cars are being left unpainted, the lamps being fitted with shades that are deeper on the side next to the window.

At a meeting of the Torquay Chamber of Commerce to consider the new lighting restrictions, Mr. H. J. Nisbitt, manager and engineer of the Tramways Company, asked if it was possible to have some lights in the streets in a modified form. The police superintendent replied that it was necessary that all lights should be extinguished, and that tops of lamps should be darkened and the other parts frosted. Mr. Nisbitt said if all the lights were extinguished it would be useless for him to run cars two hours after sunset, and as the company were heavy ratepayers, this would be a serious matter to them.

In reply to an inquiry by the Tramways Company's manager, the Grimsby Emergency Committee have recommended that the cars on the Bargate route should cease running at 8 p.m. in September and 7 p.m. in October.

REQUESTS FROM EMPLOYEES.

An increased war bonus of one shilling per week has been granted to employees in the traffic department of Dublin Tramways Company.

Bradford Corporation Tramways employees' union has renewed their application for increased wages in order to meet the higher cost of living.

The Tramway and Vehicle Workers' Union have forwarded an application to Sir George Askwith, chief industrial commissioner, for an advance of wages for men employed in the permanent way department of Manchester Tramways. The Tramways Committee has agreed to a suggestion by Sir George that the request should be referred to the Committee on Production for settlement. Mr. J. M. McElroy, general manager, will represent the Committee at the proceedings.

All the tramways authorities in Victoria Western Australia and Tasmania have received applications for an increase of wages.

In consideration of the stress of work undergone by the employees at Portsmouth, and also because of the abnormally successful season the cars have experienced, the Tramways Committee has decided to recommend extra payments as follow:—Weekly bonus for men of 10 per cent. on all wages up to 30s. per week; 7½ per cent. on wages from 30s. up to and including 40s.; and 5 per cent. on wages from 40s. to 50s. An honorarium to all salaried officials amounting to 5 per cent. of their annual salaries is proposed.

The women car drivers and conductors at Glasgow are dissatisfied with the award of 1s. weekly bonus by the Tramways Committee, while men are to receive 2s. Contending that they are doing the same work as men and with as great efficiency, the women have asked for the same advance as men and that the working hours be not increased.

Leeds Corporation has increased the war bonus to 2s. in the case of employees whose wages are less than 20s., and to 3s. to those whose wages are 20s. and not exceeding 60s. per week. This is an increase of practically 1s. a week all round, but it has not been given to the women or to other temporary workers. Alderman Wilson said that the women were earning as nearly as possible thirty shillings a week, and the General Purposes Committee thought they were well paid. It was open to them to apply to the Committee on Production, but the Council would oppose the application. The men's union had accepted the offer. Referring to a statement that the women were talking of striking, he said that a strike would not be an easy matter, as the undertaking was a controlled establishment. If they were dissatisfied they could leave.

A conference of railway managers and officials of the National Union of Railwaymen was opened on September 13 to consider the demand on the part of the men for a general advance of 10s. per week in wages, as distinct from the war bonus already granted. Sir Guy Granet (Midland) presided over the conference. Other managers present were Sir Sam Fay (Great Central), Mr. Guy Calthrop (L.N.W.R.), Mr. Matheson (Scottish railways), Mr. A. Beasley (Taff Vale railways), and Mr. F. Potter (Great Western).

On September 14 the Press Bureau issued the following statement: "It is understood that at the resumed meeting to day between representatives of the railway companies and of the railway trades unions, the former offered an advance of 3s. a week, in addition to the 5s. bonus given in October, 1915, and that the question whether anything more should be given should be referred to arbitration. This offer has not been accepted by the representatives of the men.

As the result of the appointment of an arbitrator to consider the claims of the employees of the Potteries Electric Traction Company and the company's offer, the arbitrator has abolished the war bonus hitherto paid by the company, as requested by the men. In lieu thereof, advances of wages are to be made upon the scale hereunder, as from August 1, 1916, such advances to be regarded as war wages:—1½d. per hour advance to permanent way and depôt men at present in receipt of 7d. per hour and under, and paid according to the hour; 1½d. per hour advance to permanent way and depôt men in receipt of upwards of 7d. per hour: shed men to be included in the above; ¾d. per hour advance to permanent way and depot boys, and 3s. 6d. per week to parcel lads; 6s. advance per week (of seven shifts of eight hours each) to stokers, as claimed, the claim that they, for the future, be rated on the standard of drivers not being established. The case of drivers not having been put forward as a difference, it is left to the company, if it thinks fit, to increase their wages pro rata. An advance of 5s. per week to truckmen, as claimed, and 4s. 6d. per week to carters; 6d. per day advance to watchmen, as claimed, it being left to the company, if it thinks fit, to give the increase of 4s. per week, as offered. The claim as regards increased payments for overtime was not established, except that night shedmen are to be paid overtime according to the present rate after 48 hours in the week, instead of after 51 hours. Prior to the arbitration arrangements had been made whereby the hours per week should be reduced by one, and that women employed on the track should be paid the same rates as men.

USE OF PETROL SUBSTITUTES

The Llandudno Motor Garage Company, at Conway Police Court, on September 11, were fined £5 in two cases of using certain motor spirit for chars-a-bancs on pleasure trips, contrary to a regulation made under the Defence of the Realm Act. The manager was fined £1 and the driver 10s. The public analyst said the fuel used contained hydro-carbonate oil, and therefore came within the dennition of motor spirit in the Act. The defence was that no evidence had been given as to the inflammability of the fuel. The test should be as laid down in the Petroleum Act of 1879. Under that Act any preparation giving off an inflammable vapour at less than 73° Fahr. was motor spirit within the meaning of the Order, and any preparation that was only inflammable at a higher degree was not.

Notice of appeal has been given by the Commercial Motor Users' Association in the foregoing and other cases in the interests of 200 owners of about 1,000 chars-a-bancs. The question has a wider interest than the use of the fuel for pleasure purposes, for if the decision stands this and other similar substitutes will be liable to the extra taxation, and cannot be used except by licence. An official of the Petrol Control Committee is reported to have said that under Sections 8 and 85 of the Finance Act the Board of Trade have decided that all substitutes for petrol come under the term motor spirit. Anything that will move a motor comes under the term motor spirit, the official added.

By the use of a paraffin-petrol mixture the London General Omnibus Company hopes to be able to restore the greater proportion of its curtailed services. Already the King's Cross to Clapham service has been reintroduced. Special carburettors are being used to secure vaporisation of the mixture, in which paraffin is used to the extent of 20 per cent. Hot air intake pipes fitted to the carburettors have proved satisfactory, but the difficulty of starting the engine from cold has not yet been overcome.

BRADFORD RAILLESS CARS.

In his annual report, Mr. C. J. Spencer, general manager of Bradford Corporation Tramways, states that the total cost of operation for the railless trolley cars was 7.9d. per car mile. This sum includes interest and sinking fund charges, and he considers that it will compare favourably with petrol omnibus figures published this year. The report adds that 2,089,484 passengers were carried at fares approximately half the rates charged on most motor omnibus undertakings. There are 20 railless traction cars in use, and the total length of the five routes was 9 miles 700 yards. The longest route is 2 miles 1,232 yards, from Foster Square to Frizinghall, including a loop round Gaisby Lane, etc. June 24, 1911, was the date when the system was opened for traffic. The appended statement shows the expenditure and receipts for the past two years:—

EXPENDITURE.

	1914-15 Average per mile	1914-15 Expenditure.	1915-16 Average per mile	1915-16 Expenditure.
	d.	£	d.	£
Traffic expenses	3.162	2,340	3.078	4,134
General expenses	.610	456	.566	759
Repairs and maintenance ...	1.955	1,446	1.748	2,348
Power expenses	.824	610	.843	1,132
Total	6.557	4,853	6.235	8,375
Balance	—	—	.301	404
INCOME.				
Traffic revenue	5.830	4,315	6.536	8,779

The car mileage was 322,390, as compared with 177,653 in 1914-15.

Lifting Jacks for Cars.—Blackpool Corporation Tramways Committee have decided to purchase twelve jacks for use in lifting a car in the event of a pedestrian being run over and passing behind the lifeguard. The implements will be housed at positions near the busiest centres. An arrangement of this kind appears to be desirable at Edinburgh, where recently, at 10 p.m., a woman was knocked down by a cable car and was pinned under one of the front wheels. Jacks had to be telephoned for from a depôt in order to raise the car. At the hospital her right leg had to be amputated.

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MISCELLANEOUS NEWS AND NOTES.

The Sale of Ilkeston Tramways.—Ilkeston Council has confirmed their decision to sell the tramways and electricity undertakings to the Nottinghamshire and Derbyshire Tramways Company for £28,150.

Trolley-Battery Vehicle for Goods Traffic.—The question of introducing the trolley-battery vehicle for goods traffic, as at Bradford, has been referred to a sub-committee of Colne Tramways Committee.

Edinburgh Cable Cars.—Finding that reasonable progress has been made with the repairs to the cars, the city magistrates have granted car licences for three months instead of one month, as previously decided.

Conductors' Seats.—Sheffield Corporation has decided not to provide seats on the cars for the women conductors. The women have short hours of service, an extra time for meals, and at the journey's end they can sit in the car.

Divided Skirts.—At the instance of Leeds tramway management, divided skirts are being worn by a number of the women conductors. If the Tramways Committee are satisfied that the garment is more suitable than the ordinary skirt, it will be generally adopted.

The Institute of Metals.—The annual autumn meeting of the Institute of Metals will be held on September 20 at 4 p.m. at Burlington House, Piccadilly, W. Sir George T. Beilby will preside, and a number of important metallurgical papers will be presented and discussed.

First Whole Day's Cessation in Eighteen Years.—In referring to the holiday given to the depleted tramway staff on Christmas Day (Sunday) at Bradford, the manager's annual report states that this was the first occasion that the service was suspended for a whole day since its inauguration in 1898.

Motor-car Runs into a Queue.—On the night of September 10 a motor-car knocked down a number of persons who were waiting for a tramcar outside the Midland Station, Sheffield. The driver asserted that the glare of the headlights of a tramcar prevented him seeing the people in the roadway.

Bradford-Leeds Through Running.—During the year ended March 31 the Leeds and Bradford through running cars carried 362,242 persons, an increase of 64,006, or nearly 22 per cent. The through route is becoming very popular, and with increased railway fares and various other restrictions, the increase is well understood.

Extension of Time for New Tramways.—Under the provisions of the Extension of Time Act, 1915, Manchester Tramways Committee is applying to the Board of Trade for a further extension of the period limited for the construction of the tramways and the compulsory purchase of lands authorised in Section 31 of Manchester Corporation Act, 1911.

Tramway War Savings Association.—Mr. J. B. Mackinnon, traffic superintendent of the London United Tramways Company, presided over a meeting of the company's employees at the Isleworth depôt, at which it was decided to form an association for investing their savings in War Loan. Associations have also been formed at the Hanwell and Fulwell depôts.

Live Electric Standard.—A man was killed at Hebburn on September 9 through touching an electric lamp standard. It was stated at the inquest that the current through the standard was caused by one of the cable wires getting into contact with the switch chamber at the top. The vibration caused by road traffic might have caused the wires to contact. The company has now adopted a new method in regard to switch chambers.

Why a Gong was not Sounded.—An inquest was held on a child who was knocked down by a Sheffield tramcar through the deceased running into the roadway when a dog jumped at her. The car was then five yards away. The motorman applied the electric brake, but it would not act at first, owing, he believed, to it having been applied too sharply. He did not sound the gong; because the foot he used for that purpose was on the sand pedal.

Improvements on Relaying.—Salford Corporation Tramways, which were opened in 1901, have now had 14½ miles of permanent way relaid, the work having began in 1908. It was continued until 1914, when the war broke out. In nearly all of the relaying rails of the Sandberg specification were used, and it is anticipated that this will give a longer life than the rails previously used. The Thermit process was adopted for the welding of the new rails.

Henley's Telegraph Employees' War Savings. Mr. A. E. Salmon, secretary, W. T. Henley's Telegraph Works Company, states in reference to the war savings association of the staff and workpeople that the company purchases certificates on the date the first contribution is made, and, subject to the contributors not being more than two weeks in arrears, pays the thirty-first contribution of sixpence in respect of each certificate. In seven weeks 8,483 certificates have been taken up. This shows, says Mr. Salmon, that good results can be obtained without bringing in the "gambling" element.

Tramcar Accidents.—A Stalybridge car got out of control on the hill at Mottram on September 9 and ran for over a mile before it got off the track at a loop and crashed into a wall at Bower Fold. It is stated that the three passengers, driver and woman conductor, jumped off the car at an early stage. At Birmingham on September 10 a car from Lozells missed the stopping-place at Brearley Street and passed on to the single line. At the same time a car from the city had left the stopping-place at St. George's Street, and ran along the hundred yards line of single track. The drivers applied the brakes, a collision ensued and the fronts of the cars were smashed. A few passengers were slightly injured.

Value of the Municipal Tramways Conference.—Replying to a Plymouth councillor's objection to the vice-chairman of the Tramways Committee and the general manager attending the annual conference of the Municipal Tramways Association, Alderman S. H. Phillips (the chairman of the committee) said that attendance at the conference was a means of learning much about an undertaking which was constantly changing. Information could be obtained there which was exceedingly valuable in pounds, shillings and pence to that branch of municipal enterprise. The Plymouth undertaking had profited by attendance at the conference of the chairman of the committee and the manager from time to time; in fact, it had been one of the causes of the splendid results which had been achieved.

Energy from Four Sources.—Now that the Board of Trade has urged upon the owners of electricity undertakings the importance of linking up in the interests of national economy during the war, it is of interest to note that Salford Corporation Tramways obtain energy from four sources. In 1915-16 the energy used for haulage, lighting of cars, etc., comprised 9,761,335 units, of which Salford supplied 7,821,017, Manchester 1,218,060, Eccles 704,909, and the South Lancashire Tramways Company 17,349. Deducting 36,547 units recharged to Manchester, the Salford cars used 9,724,788 units. The average power expenses per car mile totalled 2.172*d.*, and the mileage was 5,421,896, giving an average consumption of 1.793 units per car mile, an increase of .126 units as against the previous year. In this calculation the mileage run in Trafford Park is excluded, the power being supplied by the Trafford Park Company.

Fuel Economy in Electric Power Supply.—In the Chemical and Engineering section of the British Association meeting at Newcastle on September 8, a report was presented by the committee appointed last year to consider the question of fuel economy. Five sub-committees have been appointed, which are now entering upon detailed work in various aspects of the problem. Mr. R. P. Sloan, Gosforth, contributed a paper to the Engineering Section, in which he traced the great economy in fuel as a result of electric power supply in North-East England. The total saving due to utilisation of waste heat on the North-East Coast now amounted to some 150,000 tons per annum. Mr. C. H. Merz, Newcastle, chairman of the Tyneside Tramways Company, dealing with electric power distribution, said that if power undertakings were developed all over the country as on the North-East Coast, the resultant economy in coal consumption would, in the near future, amount to 25 million tons per year, and eventually to 50 or 60 million tons.

Applications to Tribunals.—In applying for the exemption of a motorman, the manager of Bath Electric Tramways Company stated that he had had to curtail the service by 25 per cent. owing to the lack of drivers. The Tribunal granted conditional exemption. On September 8, at Buckhaven Tribunal, appeals were heard from the Wemyss and District Tramway Company, Mr. W. T. Dawson, general manager, stating that before the war they had 38 men on the traffic staff. There were now 11. Twenty women had been employed to release men for the army. Two months' exemption was granted the unmarried men, and conditional exemption to the married men. At Southampton a conductor who had become liable under the compulsory regulations was granted three months' exemption. He had already served for 19 months in France as a reservist, and was in the retreat from Mons, leaving the army on March 7 last on the expiration of his engagement. Coventry Tramways department has been granted two months' exemption for a number of employees. The Tribunal suggested that as it was admitted that men above military age were capable of doing the work, efforts should be made to replace single men.

PERSONAL.

Sergeant J. Neary, who enlisted in the East Lancashire Regiment from Salford Corporation Tramways, has gained the Military Medal.

Sir John Corke, a former chairman of Portsmouth Tramways Committee, has been selected as Mayor for the fifth year in succession.

Mr. E. Grimes, station engineer of Hackney Electricity Works, has been appointed superintendent of the Barking Council's power station.

Corporal W. Harley, King's Royal Rifles, who has been awarded the Military Medal, was an employee on the Manchester Corporation Tramways.

Mr. H. W. Leonard, who for the past six years has held an important position in the General Electric Company's publicity department, has recently joined the London Electrical Engineers.

CONTRACTS AND ORDERS.

Salford Council has ordered a steam recorder from the Lea Recorder Company and a feed-water heater from Royles, Ltd.

Manchester Tramways Committee has placed an order with Messrs. F. Smith and Co., Ltd., Salford, for copper trolley wire.

FINANCIAL REPORTS AND MEETINGS.

United Electric Car Company.—The report for the year ended June 30 shows that, after charging £5,228 for depreciation (including £4,500 added to reserve), the profit is £6,562, to which has to be added £4,707 brought forward. After deducting £6,000 for the preference dividend in each half-year, £5,270 is carried forward. Messrs. R. H. Prestwich and R. S. Boddington are standing for re-election to the board at the annual meeting on September 20.

Hongkong Tramways.—The report for 1915 shows a net profit, after writing £6,625 off for depreciation, and including £6,807 brought forward, of £18,071. A dividend of 12 per cent. has been declared, and a further £2,000 has been written off the cost of the undertaking, leaving £6,321 to be carried forward. The net profit has increased from £9,500 to £11,200, while the dividend is 2 per cent. more than in 1914, and within ½ per cent. of the rate paid for 1913.

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Dundee, Broughty Ferry and District Tramways.—After providing for interest on debenture stock and £785 in redemption of debenture stock, the profit for 1915 amounted to £2,595. After payment of an interim dividend at the rate of 6 per cent. per annum on the preference shares, there is a balance of £1,344, and the directors propose to pay a final dividend on the preference shares at the rate of 6 per cent. per annum, and to carry forward £105. The receipts have suffered abnormally owing to the lighting restrictions and other war conditions during the winter months, and particularly unfavourable weather during the early summer. The proceeds of the sale of the western portion of the line to Dundee Corporation have been applied in the purchase of debenture stock.

Dumbarton Burgh and County Tramways.—At the annual meeting, Mr. George Balfour, who presided, said the total receipts for the year amounted to £26,041, being an increase of £2,737. Expenses had increased by £2,052, the increased expense being distributed as follows: Traffic expenses, £844; general expenses, £148; repairs and maintenance, £722; electricity supply, £338. The increased expenses were entirely due to abnormal cost of material and labour, but the net profit available for distribution was increased by upwards of £700 compared with the preceding year. The following dividends were declared:—On the preference shares at the rate of 6 per cent. per annum for the half-year to July 31, and on the ordinary shares of 1½ per cent. for the year, in each case under deduction of income-tax.

Salford Corporation Tramways.—Mr. G. W. Holford's annual report to the Tramways Committee is summarised in its financial aspect in the appended table, which also gives the corresponding figures for the two preceding years. Of the 75¼ miles of tramways worked by the corporation, 36¾ miles are owned by the authority, the remainder being lines leased by surrounding towns and lines in Manchester and Worsley over which running powers are granted, while 2½ miles in Trafford Park are worked jointly with Manchester Corporation. A record number of passengers were carried, the figure being 56,458,266, an increase of 2,114,358 on 1915, the previous best. The receipts were £271,403, as against the record receipts in 1914, when 54,343,908 passengers were carried. The earnings per car mile were 11.853*d.*, the highest on record, but owing to the depleted staff the car mileage was only 5,495,295, as against 5,828,232 in 1914-15 and 6,235,278 in 1913-14. In order to permit of the payment of £22,000 in relief of the rates, £3,526 has been transferred to the current account from the depreciation and renewals fund. The balance remaining in the depreciation fund is £21,266. From the commencement of the undertaking £107,713 has been paid into this fund, of which £86,446 has been expended:

	1916-15.	1915-14.	1914-13.
Capital expenditure	£752,263	£725,485	£723,023
Amount outstanding	£501,285	£511,853	£532,821
Traffic revenue	£271,403	£257,935	£272,758
Total revenue	£271,554	£257,977	£272,812
Working expenses	£169,916	£170,521	£178,770
War allowances	£13,136	£6,227	--
Gross balance	£88,502	£81,229	£94,042
Net profit	£22,000	£34,265	£22,000
Passengers carried	56,458,266	54,343,908	53,124,546
Fare per passenger	1.149*d.*	1.134*d.*	1.227*d.*
Car mileage	5,495,295	5,828,238	6,235,278
Units per car mile	1.793	1.667	1.666
Power cost per car mile ...	2.172*d.*	2.050*d.*	1.936*d.*
Traffic receipts per track mile	£3,580	£3,403	£3,646
Traffic receipts per car mile ...	11.853*d.*	10.622*d.*	10.490*d.*
Expenses per car mile ...	7.420*d.*	7.022*d.*	6.881*d.*
Ratio of working expenses ...	62%	66%	65%
Total track mileage	75m. 64c.	75m. 64c.	75m. 64c.
Number of cars in stock ...	210	200	200

Brazilian Traction Light and Power Company.—In the annual report the revenue is given in Canadian currency as appended:—

From securities owned and under contracts with subsidiary companies $5,339,192.76; interest on advances to subsidiary companies $273,683.41. Deducting general and legal expenses, administration charges and interest on loans $218,074.43, the surplus available for dividends was $5,394,801.74. Four quarterly dividends at 1¾ per cent. each on preference shares ($600,000) and two quarterly dividends of 1¾ per cent. and two quarterly dividends of ½ per cent. each on the ordinary shares ($4,249,380) absorbed $4,849,380, leaving a surplus of $545,421.74. Although rigid economies have been effected, the cost of operation and maintenance has been adversely influenced by the rise in the price of materials, and by the enormous advance in ocean freights. Mr. A. Mackenzie, the president of the company, in his report states that the gross earnings of the Rio de Janeiro division in Brazilian currency exceeded those of the previous year by 2,923,000 milreis, there being substantial increases in all departments except the tramways, the earnings of which were slightly below those of 1914, the increase in total net earnings was 1,916,000 milreis. Notwithstanding the greatly increased cost of material, freights and other charges, the ratio of operating expenses was reduced to slightly below that of 1914. Eleven new 13-bench electric cars were put into service, and considerable progress was made on the construction of 30 10-bench trailer cars. The car miles run were 24,409,259, against 24,815,078, and the passengers carried 191,556,302, against 192,103,635. The gross income of the Rio de Janeiro Tramways, given in Brazilian currency, was 24,608,003 milreis, as compared with 24,850,432 in 1914, 25,530,923 in 1913, and 23,934,427 in 1912. During the early part of the year the earnings of the Sao Paulo division were maintained at about the level reached during the latter part of 1914, but later there was a marked improvement which continued throughout the year, especially in the light and power departments, which showed an increase in their net earnings of 9.6 per cent. over 1914. There was a slight decrease in tramway earnings. The total increase in gross and net earnings in Brazilian currency was 452,000 milreis and 49,000 milreis respectively. There are indications that there will be a considerable increase in earnings for the current year, especially in the tramways. The car miles run were 9,425,231 against 9,496,091, and the total passengers carried 51,574,145, against 53,732,292. In connection with the Sao Paulo telephone system, arrangements have been made for the use of the poles of the tramways and the joint use of the underground duct system of the tramways, thereby materially reducing the cost of construction and maintenance.

Bradford Corporation Tramways.—Subjoined will be found the chief items in the accounts for the year ended March 31, 1916, and also for the two preceding years. In his 18th annual report to the Tramways Committee, Mr. C. J. Spencer, general manager observes that this first complete year under war conditions brought an ever increasing stress of circumstances, which had been met by various special arrangements and temporary schemes. The steady drain on the employees for service with the colours and for the manufacture of munitions had been met in the main by female labour. It was gratifying to record that notwithstanding these extraordinary conditions there had been no serious accident, although there was an increase of over 4,000,000 in the number of passengers. Traffic revenue (excluding railless) increased by £9,480, and notwithstanding a decrease of 316,865 in the car mileage, or 5 per cent., the revenue increased 3.8 per cent., which was about the usual normal yearly increase. In the expenditure there was a net rise of £8,599, of which £5,554 was an increased amount paid to dependents of reservists, which could not fairly represent expenditure necessary to run the undertaking, so that the real net increase was about £3,000. Despite this increase, the net growth of revenue was £6,830. A closer examination of the year's trading the manager observes, was not so reassuring. Expenditure per car mile had risen to the record figure of 9.100*d.*, and had the receipts been the same per car mile as the average of the previous five years, there would have been a loss of nearly ½*d.* per car mile, representing a sum of £12,000. The higher costs in the main might be allocated to the increased costs of labour, material and power. Mr. Spencer points out that there is no real economy in the decrease of £2,000 in the cost of permanent way maintenance and of £3,261 in the cost of car repairs. These decreases were due to shortage of labour, which had led to 20 cars being entirely withdrawn from service as unsafe for public operation. While the cost of operation apart from financial charges had reached a record figure, the average fare per passenger was at a record low figure of 1.047*d.*, or 1.13 per cent. lower than last year and 10 per cent. lower than 1910-11.

	1916-15	1915-14.	1914-13
Capital expenditure	£1,043,135	£1,043,054	£1,040,118
Amount outstanding	£590,988	£634,618	£653,504
Traffic revenue	£314,480	£309,321	£298,525
Total revenue	£341,624	£329,888	£317,133
Working expenses	£246,613	£243,312	£231,151
War allowances	£8,338	£2,784	-
Gross balance	£86,673	£83,792	£85,982
Net profit	£20,771	£32,442	£29,447
Passengers carried	74,082,612	70,077,271	67,075,166
Fare per passenger	1.047*d.*	1.050*d.*	1.058*d.*
Car mileage	5,877,192	6,194,057	6,206,230
Units per car mile	1.900	1.900	1.894
Power cost per car mile ...	2.105*d.*	2.027*d.*	1.948*d.*
Traffic receipts per track mile	£2,892	£2,807	£2,703
Traffic receipts per car mile ...	12.842*d.*	11.816*d.*	11.486*d*
Expenses per car mile ...	9.450*d.*	8.774*d.*	8.376*d.*
Ratio of working expenses ...	74.030%	74.600%	73.138%
Total track mileage	118m. 15ch.	118m. 9ch.	106m. 20c.
Number of cars in stock ...	236	252	245

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-four of the principal tramway undertakings in the United Kingdom for the week ended September 2 give total receipts of £108,197, or £18,093 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or sixty-nine more than for the corresponding week. The receipts this year were at the rate of £88 17s. 6*d* per mile of single track, and last year at the rate of £83 6s. 10*d.*, thus showing an increase for the week of £5 10s. 8*d.* per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. Sept. 14.	A Week Ago.
5%	5%	Alabama Traction, 5% 1st. Mt.	—	67	66	66xd
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	70/-	73/4½
4%	4%	Do. 4% Deb. ...	100	91	74	74½
4½%	4½%	Do. 4½% Deb. ...	100	98½	76	76½
5%	5%	Do. 5% Deb. ...	100	96	75	74½
1/-	7d	Auckland Elec. Trams. Ord. ...	1	1⅝	21/-	21/3
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	93⅛	93⅛
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅛	10⅛	10⅛
4½%	4½%	Do. 4½% Deb.	100	96	83	83
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	91½	92
$1⅛	$1⅛	Brazilian Trac. & Power Ord. ...	$100	66	61⅛	61⅛
$1⅛	$1⅛	Do. 6% Cum. Pref.	$100	97	92½xd	93
4/-	4/-	Brisbane Elec. Trams. Old. ...	5	7⅛	7⅛	7
2/6	2/6	Do. 5% Cum. Pref.	5	5	85/-	85/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord. ...	100	107	55	51
5%	5%	Do. Pref. Ord.	100	106	57½	54
5%	5%	Do. 5% Cum. Pref.	100	103	71	71
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	89	88½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	68½xd	68½
—	£3	Brit. Elec. Trac. Ord.	100	—	35½	36
—	6%*	Do. 6% Cum. Part Pref. ...	100	—	80½	80
5%	5%	Do. 5% Deb.	100	92	86	86
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	70	70
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	82½	92½xd
3/-	6/6	Calcutta Tramways, Ord. ...	5	7½	6½	6½
1/3	1/3	City of B.A. Trams.	5	5½	89/7½	90/7½
5/-	4/-	Dublin United Trys 6% Pref.	10	12	11½	10⅞
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	28/9	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb. ...	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	½	2/1½	2/1½
6/-	6/6	Lanarkshire Trys. Co.	10	10½	9⅜	9⅜
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9½d.	9½d.	Llandudno & Colwyn B. Ord. ...	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	1⅜	2/3	2/3
6d.	6d.	Do. 5% Pref.	1	⅝	8/1½	8/1½
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	62⅜	62⅜
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88⅜	88⅜
5%	5%	Do. 5% Inc. Deb.	100	88½	81	81
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	47⅛	47⅛
3/-	3/-	Madras Elec. 6% Pref. ...	5	5⅛	96/6	96/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	66½	66½
$1⅛	$1⅛	Manila Elec. R. R. & Light ...	$100	102	69½xd	69⅛
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	78	78
$1⅛	$1⅛	Mexico Trams. Common ...	$100	70	30½	29⅛
5%	5%	Do. 1 Mt. 5% G.B.	—	8¼	44⅛	43½
6%	6%	Do. 6% Mt. Bds.	100	76	35½	35½
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	96½	96½
4½%	4½%*	Do. 4½% Stg. Debs.	100	99	95½	95½
1/2*	1/2½*	National Steam Car	1	½	19/6	19/9½
9½d.*	9½d.*	New General Traction	1	⅝	7/9½	7/6½
6d.	8½d.	Northern Gen. Trans. Ord. ...	1	⅝	15/4½	15/4½
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	66/-	66/-
5%	5%	Do. 5% 1st Deb.	100	89½	74	73½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80½	80½
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	⅛	11/-	11/
10d.	8d.	Provincial Trams. Ord.	1	⅛	16/6	16/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84	84
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	91⅞	92
5%	5%	1st. Mt. 5% 50 yr.	100	89½	82½	81⅜
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	91½	91½
5%	5%	Do. 5% Perp. Deb.	100	99½	81½	81½xd
—	—	Singapore Elec. Trams	5/-	¼	4/10½	4/10½
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	96½	96½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	82½	82½
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	94½xd	94½xd
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	78	78½
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	¾	9/3	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	90/-	90/-
—	—	Metropolitan Dist. Ord. ...	100	21⅜	18½	18½
—	—	Undgd. Elec. Rys. of London ...	10	2½	37/6	38/9
		Do. "A"	1/-	¾	6/-	6/-
4½	4½	Do. 4½% Bds of 1933 Rd.	—	99	101½	101½
6	6	Do. 6% 1st Cum. In. Db.	100	114	105½	105½xd
6	6	Do. 6% In. Bonds Rd. ...	—	88	89½	89½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1915	Latest Return. 1916	Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	Sept. 9	£49,469	£52,818	37	£1,824,807	— £8,134
Auckland (28 days)	Aug. 25	19,876	20,469	8	41,974	— 55
Ballarat and Bendigo	July 16	2,677	2,704	16	13,079	+ 905
Brazilian Traction Mlrs.	July	6,703,000	7,195,000	31	47,145,000	+2,757,890
Brisbane	Aug.	35,064	37,900	9	265,130	+ 20,416
British Columbia $	July	510,723	538,293	5	538,293	+ 27,570
Buenos Aires Lacroze	Aug.	41,468	36,431	9	74,870	— 8,058
Burmah Tramway. Rs.	July 29	3 726	3,437	52	...	+ 3,920
Calcutta Rs.	Sept. 9	67,332	72,268	37	2,435,410	+ 109,785
Cape Town	Aug.	...	13,394	...	...	...
Carthagena & Herrerias.	Aug.	1,523	2,081	35	20,821	+ 6,493
Cordoba	July	14,375	14,263	18	57,313	+ 776
East India	Aug.	2,266	2,522	4	2,522	+ 256
Hong Kong $	July 29	11,938	17,172	33	420 128	+ 95,286
Kalgoorlie	June	2,707	2,500	26	14,937	— 1,242
La Plata	Aug.	4,164	3,792	35	33,627	— 357
Lima	Apr.	31,633	33,556	18	134,629	+ 5,614
Lisbon Escu.	July	...	206,280	...	...	...
Madras (2 weeks)	Aug. 15	30,869	32,269	33	439,380	+ 33,100
Manila	July	23,750	33,700	31	887,739	+ 39,986
Manaos Rs.	July	...	152,350	...	...	...
Melbourne	May	...	69,275	...	...	...
Montevideo	July	25,161	25,220	39	266,288	+ 14,435
Pernambuco	Sept. 11	2,902	3,437	36½	108,148	— 3,444
Peruvian $	Aug.	819,039	895,900	9	1,731,330	+ 187,453
Port Elizabeth	Aug.	...	2,863	...	...	...
Rangoon	Aug.	4,510	4,253	35	37,191	— 1,693
Shanghai $	Aug. 2	26,833	28,692	...	...	...
Singapore $	Aug. 5	12,054	14,223	31	385,507	+ 42,324
Toronto $	July	773,013	867,789	31	6,202,988	+ 619,912
Winnipeg	July	248,022	242,688	31	1,944,162	— 56,116

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Name.	Week ended	Latest Return. 1915	Latest Return. 1916	Incr. or Dec.	Wks.	Aggregate. 1916	Incr. or Dec.
Aberdare U.D.C.	Sept. 5	£343	£407	+ 64	23	£8,954	+ £945
Aberdeen Corporation	,, 6	1,869	2,252	+ 383	14	28,037	+ 1,157
Accrington Corp.	,, 6	633	663	+ 30	23	13,632	+ 457
Ayr Corporation	,, 9	442	575	+ 132	17	9,423	+ 864
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	,, 10	1,499	1,578	+ 79	23½	86,144	+ 3,201
Birmingham Corp.	,, 9	15,504	16,856	+1,352	23	333,087	+ 60,923
Do. Motor Omnibuses	,, 9	1,002	1,043	+ 41	23	23,320	+ 3,028
Blackburn Corp.	,, 6	1,364	1,323	— 41	23½	30,929	— 912
Blackpool & Fleetwood	,, 2	1,976	2,352	+ 376	35	31,306	+ 2,978
Blackpool Corp.	*	...	...	...	...	...	...
Bolton Corporation	,, 10	3,423	3,407	— 16	24	69,152	+ 4,083
Bournemouth Corp.	,, 13	2,570	2,998	+ 428	24	59,482	+ 3,823
Bradford Corporation	,, 9	6,862	7,045	+ 183	23	163,426	+ 4,704
Brighton Corporation	,, 10	1,497	1,695	+ 198	23½	32,032	+ 2,990
Bristol	,, 8	10,064	10,895	+ 831	36	361,679	+ 15,512
British Elec. Federa'n	*	...	...	...	...	...	...
Burnley Corporation	,, 9	1,909	2,009	+ 100	24	41,599	+ 2,056
Burton-on-Trent Corp.	,, 10	311	294	— 17	23	6,438	— 562
Bury Corporation	,, 10	1,635	1,579	— 56	24½	34,839	+ 1,330
Cardiff Corporation	Aug. 26	3,005	3,365	+ 360	21	64,333	+ 4,882
Chatham & District	Sept. 7	1,372	1,409	+ 37	36	44,005	+ 1,870
Chesterfield Corp.	Aug. 31	275	302	+ 27	22	6,357	+ 253
Colne Corporation	Sept. 9	312	317	+ 5	...	...	...
Cork Electric	,, 7	559	598	+ 39	36	18,334	+ 184
Croydon Corporation	*	...	...	...	...	...	...
Derby Corporation	,, 9	1,137	1,185	+ 48	23½	27,082	+ 1,705
Dover Corporation	*	...	...	...	...	...	...
Dublin & Lucan	,, 8	172	166	— 6	10	1,943	+ 199
Dublin United	,, 8	6,561	6,739	+ 178	36	216,425	+ 3,072
Dundee City	,, 6	1,443	1,493	+ 50	16½	23,341	+ 679
East Ham Corporation	,, 9	1,375	1,330	— 45	23½	31,204	+ 5
Exeter Corporation	,, 8	433	472	+ 39	23	9,557	+ 150
Glasgow Corporation	,, 9	22,947	23,809	+ 862	14⅜	337,054	+ 25,590
Glasgow Subway	,, 9	1,015	1,083	+ 68	36	41,065	+ 3,845
Glossop (U. Elec. Supp.)	,, 9	146	153	+ 7	37	5,098	+ 517
Halifax Corporation	,, 5	2,476	2,545	+ 69	22½	53,998	+ 957
Do. Motor Omnibuses	,, 5	56	53	— 3	22½	1,151	— 60
Hastings & District	,, 8	1,517	1,734	+ 217	36	38,166	+ 2,260
Huddersfield Corp.	,, 9	3,535	3,568	+ 33	23	70,389	+ 6,102
Hull Corporation	,, 9	2,992	3,067	+ 75	23	73,095	+ 1,234
Ilford U.D.C.	,, 9	656	697	+ 41	23	16,485	+ 809
Ilkeston Corporation	,, 13	148	150	+ 2	24	3,436	+ 169
Ipswich Corporation	,, 11	671	560	— 111	23	13,037	— 524
Isle of Thanet	,, 9	868	752	— 116	49	18,205	— 3,018
Kilmarnock Corp.	,, 9	191	182	— 9	16½	3,006	— 13
Lanarkshire	,, 7	2,250	2,500	+ 250	36	82,542	+ 12,717
Lancashire United	,, 6	2,241	2,205	— 36	36	64,996	+ 2,637
Leeds City	,, 9	9,377	10,075	+ 698	24	232,850	+ 20,724
Leicester Corporation	*	...	...	...	...	...	...
Leith Corporation	,, 9	826	913	+ 87	16½	15,219	+ 1,525
Leyton U.D.C.	,, 7	1,757	1,771	+ 14	23	39,770	+ 349
Liverpool Corporation	,, 9	14,069	14,662	+ 593	36½	508,078	+ 25,557
Llandudno & Colwyn B.	,, 8	605	780	+ 175	40½	14,931	+ 659
London County Council	July 19	46,999	48,584	+1,585	15½	755,621	+ 98,068
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation	*	...	...	...	...	...	...
Maidstone Corporation	Sept. 7	253	246	— 7	23	5,180	— 146
Manchester Corp.	,, 6	18,770	19,099	+ 329	23	444,309	+ 24,954
Met. Elec. Trys.	*	...	...	...	...	...	...
Nelson Corporation	*	...	...	...	...	...	...
N'castle-on-Tyne Corp.	,, 9	6,636	6,373	— 263	23	154,027	+ 4,412
Newport (Mon.) Corp.	,, 9	880	1,020	+ 140	23	22,285	+ 2,058
New St. Helens & Dist.	,, 6	1,224	1,187	— 37	10	12,043	+ 447
Northampton Corp.	,, 8	751	733	— 18	23	16,599	+ 1,362
Nottingham Corp.	,, 7	3,904	4,187	+ 283	23	90,644	+ 2,264
Oldham Corporation	,, 10	2,554	2,504	— 50	24	61,908	+ 3,692
Portsmouth Corp.	,, 19	3,087	3,422	+ 335	...	...	...
Preston Corporation	,, 6	998	1,196	+ 198	22⅝	25,330	+ 2,802
Provincial	,, 12	2,762	2,894	+ 132	49	118,386	+ 6,288
Reading Corporation	,, 7	891	975	+ 84	22⅝	19,779	+ 1,006
Rhondda Tramways	Aug. 31	1,252	1,404	+ 152	35	44,228	+ 3,488
Rochdale Corporation	Sept. 9	1,963	1,908	+ 55	23½	43,472	+ 1,595
Rotherham Corp.	,, 13	1,238	1,657	+ 419	23⅝	36,589	+ 8,874
Salford Corporation	,, 11	5,667	5,667	— 60	22⅝	131,763	+ 7,034
Sheffield Corporation	,, 12	9.519	10,599	+1,080	24½	254 273	+ 40,753
Southampton Corp.	,, 6	1,682	1,916	+ 234	22⅝	38,625	+ 3,147
Southend-on-Sea Corp.	,, 6	1,074	1,351	+ 277	23	24,450	+ 2,498
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	,, 9	848	892	+ 44	23½	19,895	+ 799
Sunderland Corp.	,, 10	1,598	1,872	+ 274	23	38,980	+ 2,694
Sunderland District	,, 6	604	724	+ 120	44	27,402	+ 1,775
Swindon Corporation	,, 6	214	240	+ 26	22⅝	4,752	+ 89
Torquay Tramways	,, 7	786	983	+ 197	36	21,562	+ 1,345
Tyneside Trys. & Tmrds.	,, 6	662	713	+ 51	10	7,286	+ 513
Wallasey Corporation	,, 9	1,486	1,596	+ 110	23½	34,220	+ 1,875
Walsall Corporation	,, 9	811	838	+ 27	37	29,737	+ 2,992
Walthamstow U.D.C.	,, 9	986	1,158	+ 171	23	26,623	+ 3,673
Warrington Corp.	Aug. 31	463	520	+ 57	22	10,825	+ 825
West Ham Corporation	Sept. 7	3,245	3,184	— 61	22⅝	75,459	+ 2,097
Wigan Corporation	,, 7	1,587	1,711	+ 124	23	88,730	+ 3,208
Wolverhampton Corp.	*	...	...	...	...	...	...
Yorkshire (W. Riding)	,, 10	1,748	1,911	+ 165	37	64,901	+ 5,961

* Issue of Traffic Returns suspended during the War.

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THE

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

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SATURDAY, SEPTEMBER 23, 1916.

MUNICIPAL TRAMWAYS ASSOCIATION.

Tramway authorities have surmounted with notable success the numerous difficulties so far created by the war, and unless the conflict should be more prolonged than may reasonably be expected the future may be viewed with quiet confidence. Two factors that may give rise to complications are the taking of more tramway men for military service, which will no doubt be necessary, and the obtaining of supplies for renewals. Any further drain upon the employees of the works permitted to manufacture machinery and materials required for tramway maintenance would prove very serious, not only from the point of view of tramway operation but from the wider standpoint of national interests. As regards these matters the Municipal Tramways Association, which has afforded great assistance to the industry since the outbreak of war, may be counted upon to exercise a useful influence. In view of the services of the Association to municipalities, it is surprising that several of the smaller Corporations owning tramways were not represented at the conference which was concluded yesterday. The satisfactory position of tramway undertakings to-day is due, indeed in no small measure to the excellent work of the councils of both associations that now represent tramway interests in this country; and it is more important than ever before that each of the undertakings should afford them all the support possible. Those short-sighted authorities that through mistaken notions of economy neglect to send their officers and delegates to the meetings, should consider what would be their position had the Municipal Association not been in existence during the war and each local authority had had to rely upon its own unaided efforts. Had it not been —to take one instance only—for the Association's representations, the requirements of the Lights (Vehicles) Order would, as the president reminded the conference, have entailed a large expenditure exceeding no doubt by a hundredfold or more the cost of sending delegates to the conference and in maintaining membership in the Association. From a national point of view the importance of tramways after the war will be greater than ever before. All kinds of transportation will be of immense assistance in meeting Germany's effort to capture many markets; and Mr. Fisher not inappropriately suggested that tramway operators will be able to do much to assist British enterprise through the channel of public service that they represent. In this connection his reminder that in tramway enterprise there is no such thing as finality was especially opportune. No better evidence of the truth of that assertion could be desired than the two papers that occupied the Conference on Thursday. Difficulties will have to be overcome before tramways can be utilised for goods, but there is every indication that the curtailment of other means of transit caused by the war will result in the tramways shouldering some of the burden, notably at Leeds and Bradford. Very timely were Mr. J. M. McElroy's remarks on passenger transport in large cities. Manchester is not the only place in which means will have to be devised above ground for remedying the lack of foresight shown in laying out the main central thoroughfares. Except in a few instances little attention has been given to the problem, although there are many places where the authorities would do well to follow Mr. McElroy's advice that a representative body should be appointed to consider the matter. That advice was supported by Mr. Hamilton's suggestion that ten years ago no tramway operator would have looked for the great increase in traffic apparent in recent years, the volume of which has been increased by the war industries. It must be the aim of our leaders in industry to be prepared for the outburst of activity that will follow the war and tramway managers must not be behind in doing their part.

THE CONFERENCE.

The Annual Conference of the Municipal Tramways Association was held on Thursday and yesterday (Friday) at the Surveyors' Institute, Westminster, under the presidency of Mr. Peter Fisher, general manager, Dundee Corporation Tramways. The first event on Thursday was a meeting of Executive Council, after which Mr. Fisher delivered his presidential address at the opening session.

At the outset the President welcomed the deputy-chairman and the other representatives of the London County Council; and Mr. W. J. Squires, ex-chairman of the Highways Committee, in reply, said he regretted to report that Mr. Fell, the chief officer of the tramways, had had a relapse and had been ordered on a six months' voyage. He was sure that the conference would join with him in expressing the hope that he might return restored in health. (Hear, hear.) Mr. J. B. Hamilton and Mr. H. E. Blain supported Mr. Squire's expression of hope, and the President observed that the conference would unanimously endorse the speakers' sentiments.

Mr. C. J. Spencer announced that Mr. Blain had invited the delegates to inspect the London General Omnibus training school at Chelsea, for which purpose omnibuses would be in waiting. For Friday, Mr. Stokes, the manager of Bexley Council Tramways, had asked the delegates to visit that undertaking and inspect the Woods-Gilbert rail-planer at work. The London County Council suggested an inspection of their trailer cars at Westminster Bridge, in special vehicles leaving the bridge at noon. Any delegates who cared to visit the L.C.C. power station and the central repair depôt on Friday afternoon would be welcome.

Adverting to the report of the Council, the President observed that a large proportion of their work had been in relation to problems arising out of the war. In connection with the Munitions of War (Amendment) Act, 1916, the Council, with valuable outside assistance, succeeded in getting the term "munition work" extended to cover "tramway facilities." Forty-four undertakings were up to this date certified under the Act, and many others were given certificates to facilitate the delivery of supplies for tramway maintenance. Tramways were playing a very important part in the national crisis in carrying workpeople, thus preventing a reduction in output of munitions, etc. It was remarkable that fares in the main had not increased very seriously, but having regard to the largely increased costs it was not surprising that the question of increasing revenue should demand the attention of those operating tramway undertakings. Having referred to the statistics of employees who had joined the forces or entered munition factories, to women conductors and drivers, to war allowances, etc., prepared by the hon. secretary, which were summarised in our issue of Sept 16, the President observed that tramways were also doing much to assist the national cause in ways that could not be expressed in figures. Turning to future problems he mentioned war wages and bonuses, and the position to be taken up regarding employees who might receive pensions but would still be able to perform certain duties. Municipalities would sympathetically consider those ques-

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tions and it was to be hoped that friendly conferences between all interested would take place in a spirit of reasonableness. Germany would make a determined effort to regain in the market-place what she had lost on the battlefield. Although tramway operators were neither manufacturers nor merchants, they could do much to assist British brains and ingenuity through their important channel of public service. Referring to the appropriateness of the paper dealing with goods transport on tramways, the President said it seemed doubtful whether the Government had yet realised the great assistance tramways could render at the present time as a transit instrument for goods and munitions. In conclusion he urged that in addition to finding work for their own employees on their return from the war they must do all in their power to assist others who had suffered in the national cause, and he paid a touching tribute to the men who had laid down their lives.

Alderman Flint (Leicester), proposed a vote of thanks to the President for his paper, and the motion was carried by acclamation.

Passenger Transportation in Large Cities.

Mr. J. M. McElroy, general manager, Manchester Corporation Tramways, presented "Some Notes on Passenger Transportation in Large Cities." He observed that as cities grow and the riding habits of the people develop, it becomes more difficult to make the channels of passenger transport equal to the ever-growing demands. Every extension of the means of transit into the outer zones adds to the difficulties of handling traffic in the central zone, and in time the congestion becomes acute. While it is approximately true as regards American cities that the number of passengers carried increases in the same ratio as the square of the population, in some of our cities the number of passengers is increasing at a much greater ratio. To illustrate this the author submitted diagrams relating to Manchester and Greater London during the past three decades. In considering the traffic statistics of various cities it may be very misleading to draw general inferences unless the local circumstances are kept clearly in mind. In short, comparative statements as to the number of passengers tend to be misleading because they do not indicate the average distance travelled. The ultimate volume of passenger traffic that can be dealt with on the street surface is limited by the capacity of the arterial routes near the central parts of the city. When the traffic on these routes approaches the saturation point then additional arteries must be opened up or other transit facilities provided. The new facilities that may be provided are railways in shallow subways, in deep tubes, and on elevated structures, and surface cars running in shallow subways in the congested areas. Many cities have not waited until the saturation point of the surface facilities has been reached before underground or overhead railways have been constructed, because the demand for the railways has arisen through the constant desire for quicker movement. Time-saving has been the main factor that has led to the construction of many city railways, and the patronage they receive depends largely upon the time-saving capabilities of the lines. Experience shows that the provision of shallow subways into which surface cars can be run so as to relieve the congestion in the central parts of cities cannot be justified owing to the great cost of construction and the comparatively small amount of traffic that can be passed through them. Underground lines of any description can only be justified by a dense traffic demanding the operation of high-speed trains run at close intervals. The surface lines should gather the local traffic and feed the underground lines. It is not likely, having regard to the general experience, that private enterprise will be willing to shoulder the great outlay involved in the provision of underground facilities. In Manchester the proper course to pursue —before attempting to provide underground facilities—is to improve the existing surfacelines by opening out new parallel routes, by forming new streets and widening others, and also by adopting tramway terminals near the heart of the city, the latter being necessary on account of the narrowness and bad lay-out of the central streets. Adverting to the relative merits of tramcars and omnibuses the author observed that the former will be utilised where heavy peak loads have to be catered for. Where the volume of traffic is not great, or where there is a steady traffic flow throughout the day, motor omnibuses will probably prove to be the more suitable vehicles. In some instances it may be found to be advantageous to run the two types of vehicle along the same routes. The making of provision for handling rush-hour traffic will always be the difficult part of the passenger transportation problem. It involves a large expenditure and comparatively high operating costs. It is on account of this that competition by separate companies for the steady all-day traffic by means of vehicles that can be run on the public streets at a relatively small capital cost, which escape many of the obligations placed upon those who cater for the peak loads, is unfair, and should not be permitted. The right to operate public service vehicles, acquired by merely obtaining an annual licence, is archaic, and new legislation is urgently needed. Concessions to use the public streets should carry with them obligations in the public interest, with corresponding security and protection for the operators. The public interests are best served by making the facilities for city passenger transportation a monopoly subject to the control of the city authorities. The world's experience has shown that every city should have a permanent authority directing the initiation and carrying out of all schemes for new transit facilities.

Mr. H. H. Gordon, deputy chairman, London County Council, opened the discussion, and in a very cogent and convincing speech, supporting Mr. McElroy's conclusions as the result of his own study of traffic systems in various countries.

Other speakers included Mr. Harrison Barrow (Birmingham), Councillor Montgomery (Glasgow), Alderman F. Smith (Liverpool), Mr. Wale (Coventry), and Mr. J. B. Hamilton (Leeds).

Utilisation of Tramways for Goods Traffic.

A paper on "The Utilisation of Tramways for Goods Traffic," by Mr. G. W. Holford, general manager, Salford, and Mr. W. Clough, general manager, Bury, was read by Mr. Holford. The question was first taken up, they said, by the late Mr. C. R. Bellamy, general manager of the Liverpool Corporation Tramways, in his presidential address at the Conference of 1904. It was discussed by the Lancashire Tramway managers in 1905, by the Lancashire and Cheshire managers in 1912, and by Mr. E. H. Edwardes (South Lancashire Tramways Company) at the Blackpool Conference of the Tramways and Light Railways Association in 1913. More recently Mr. C. W. Mallins, the present Liverpool manager, had dealt with the conveyance of goods from the docks over the tramways, but so far the Dock Board had not favourably received the scheme. In 1913 the Manchester newspapers contained many references to the subject consequent on the delay in the conveyance and delivery of goods between Manchester and the mills and workshops of Lancashire. If the carriage of goods on tramways were possible the county of Lancashire with its 403 miles of continuous tramways would especially benefit. The industrial areas of Yorkshire were also linked by tramways. At Burnley in 1912 a goods wagon was propelled in front of a tramcar for the conveyance of heavy parcels. The financial results did not justify the daily running of the wagon, but it was now available on receipt of order and a load that would produce not less than four shillings. At Glasgow the Corporation, on payment of tolls, had to allow the use of a tramway for the conveyance of materials from a railway station to a shipbuilding yard. Since 1904 Huddersfield Corporation had utilised the tramways for the conveyance of coal to mills three and five miles from the railway station. Considerable work had been done at Leeds in the conveyance of goods for the Corporation and of fireclay and coal for a local company for a distance of five miles. Mr. J. B. Hamilton, the Leeds manager, was engaged in preparing a scheme for submission to the Tramways Committee for goods traffic for the general public. Full powers for that purpose were contained in all the Leeds Tramway Acts. A number of tramway authorities conveyed their own permanent way materials on the tramways, and several had organised parcel departments and provided special vans. Under the usual clause inserted in tramway bills there would appear to be no doubt that tramway authorities had power to undertake goods conveyance. Two or more attached vehicles could not be run without the consent of the Board of Trade. Liverpool Corporation had recently been granted provisional authority to run two or more vehicles attached. If junctions and sidings into goods and dock yards, mills, etc., were required it would have to be done by the proprietors, with the consent of the road authority. The authors gave figures to show that loads of a moderate character could be transported more cheaply by tramway than by railway, but remarked that as soon as it became a question of competition the advantage would be decidedly with the railways. Another phase to be considered was the need for introducing a vehicle that could utilise to some extent the benefit of the tramway system in order to reduce the handling of the goods to a minimum. The railless trolley battery vehicle introduced by Mr. C. J. Spencer as an experiment at Bradford answered that purpose. Mr. Spencer stated that its operating costs would be from 20 to 25 per cent. less than a petrol vehicle. In conclusion the authors expressed their opinion that goods conveyance would prove remunerative under certain conditions, and that the work should be undertaken by a joint board representing the several tramway undertakings interested.

In the discussion Messrs. Spencer (Bradford), Mozley (Burnley) Hamilton (Leeds), Wilkinson (Huddersfield), and McElroy (Manchester) took part, and on the adjournment a number of the members accepted the invitation of the London General Omnibus Company to visit the Milman's Street training school.

Election of Officers.

At the annual business meeting on Friday, the report of the Executive Council was adopted and officers were elected for the following year.

Mr. Henry Mozley, general manager of the Burnley Corporation tramways was unanimously elected president, and Alderman John Miles, J.P., chairman of the Bolton Corporation Tramways Committee, was elected vice-president.

Messrs. William Clough (Bury), T. B. Goodyer (Croydon), Jas. Dalrymple (Glasgow), Sir John Courtis, J.P. (Cardiff), and W. J. McCombe (Hull), were elected members of the Executive Committee.

Mr. C. J. Spencer at the earnestly expressed wish of the members consented to retain the position of hon. secretary for another year.

After the transaction of other business and a cordial vote of thanks to the retiring president for his services during the year, the conference adjourned.

Friday afternoon was spent in visits to Greenwich power station and Bexley Heath tramways where work is being carried out by the Woods Gilbert rail planer. Special cars of the London County Council tramways were placed at the disposal of the members for the purpose.

Bexley-Dartford Arbitration.—As arbitrator appointed by the Ministry of Munitions in the matter of the division of the receipts of the through running cars between Bexley and Crayford, Mr. J. M. McElroy, of Manchester, has decided that Bexley Council is right in contending that each party is entitled to retain the whole of the revenue earned on its own part of the line. That was the position taken up by Mr. H. P. Stokes, the Bexley manager, but the contention of Messrs. Balfour, Beatty and Company, lessees of the Dartford Light Railways, was that the revenue earned by cars should be divided on a basis approximately pro rata to the route length of line owned by each authority.

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REQUESTS BY EMPLOYEES.

At the invitation of Bradford Tramways Committee the employees of the department have appointed a deputation to meet the committee with respect to their application for an advance of wages. An expenditure of many thousands of pounds would be incurred if the request is fully conceded.

Newcastle-on-Tyne Tramways Committee have granted an increase of 2*s.* 6*d.* war bonus to depôt clerks, timekeepers, motormen and conductors over 21 years of age.

Glasgow Corporation have received a resolution passed at a meeting of women drivers and conductors protesting against the Tramways Committee's recommendation to increase the working hours from 51 to 54 per week for the duration of the war, the extra hours to be paid for at time and a half rates. The women also ask for the same advance in wages to be granted to them as to men, whereas the committee recommend that the men should be paid a war bonus of 2*s.* a week and the women 1*s.* The employees had asked for an advance of 6*s.*

Wigan Corporation Tramways Committee have offered the employees an increase of ½*d.* per hour in their pay. Provided that the offer is regarded as an advance apart from the war bonus, the men's union have agreed to accept it. The Special Committee on Wages has recommended that at the close of the war the increase of wages lately granted to various classes of workmen should become permanent.

Inspectors, foremen, cash clerks and others on weekly wages are recommended by Sheffield Tramways Sub-Committee as recipients of the special allowance of 3*s.* per week granted to certain employees in other departments of the Corporation.

A war bonus of 3*s.* per week has been granted to all employees over 21 years of age in the power station, traffic and permanent way departments of Newport Corporation. Sir Geo. Askwith, the industrial commissioner, had suggested that the employees' request should be submitted to arbitration, but the council decided to follow the action of the Committee on Production in elsewhere granting a war bonus of 3*s.* per week to men employed in skilled trades.

In response to a petition by the employees, the Brighton Corporation Tramways Committee recommend that a war bonus of ½*d.* per hour increase in the rate of pay be granted to all inspectors, motormen, men and women conductors, timekeepers, track cleaners, and men employed in the tramway shed and permanent way staffs, in addition to any war bonus already granted.

TRAMWAYMEN TAKEN FOR SERVICE.

Managers are being put in a very difficult position by the increasing drain of men of military age who have received a call to join the forces. The position at Glasgow will be watched with interest in view of the fact that the Tramways Committee some time ago requested even car cleaners above military age to secure munition work, their places being taken by women. In other departments also the committee are liberating every available man. Altogether there are now some 500 men eligible for military service, and it is stated that if the authorities ask for only a proportion of them, the full car service will be kept running only with extreme difficulty.

Rotherham Tribunal has granted exemption to 17 men employed by Rotherham Corporation Tramways department, on the application of Mr. E. Cross, the general manager, but a motorman and two shed employees were not exempted.

Barnsley and District Traction Company failed to secure exemption for a motorman aged 28 years, but were granted conditional exemption for several other men.

Three months' conditional exemption has been granted the Stockton Tramways Company for a fitter. Out of 16 fitters only seven are left, and altogether 401 men have been sent to the army.

In consequence of the drain upon the staff of Pontypridd Council Tramways for military service, the manager is seeking the aid of men above military age or who are otherwise ineligible.

In asking the Chatham Tribunal on September 19 to exempt a number of motormen, Mr. W. Jenson, the manager of Chatham and District Light Railways Company, said he had endeavoured to secure wounded soldiers as substitutes, but when the responsibility of driving was left to them they lost their nerve. Conditional exemption was granted.

INCREASED FARES.

Owing to the large disbursements on account of war allowances, the Leicester Corporation Tramways will, it is stated, be unable to hand over any profits next year for the relief of the rates. In the present year the committee paid over £8,000, but at the present time £11,000 a year is being expended in the shape of allowances to enlisted men. The recent demand for increased wages made by the employees would, if acceded to, mean a further expenditure of upwards of £10,000 a year. In July, 1915, fares were increased. For the year ended December 31 last the receipts showed an increase of £10,014.

Dudley Corporation has referred to committee the consideration of the action of the Tramways Company in raising the fare from the Railway Station to the Market Place from ½*d.* to 1*d.*

Kirkcaldy Tramways Committee recommend the abolition of halfpenny fares with the exception of workmen's tickets, and also the adoption of transfer tickets. The halfpenny fares were instituted at the opening of the tramways in 1903.

Keighley Council will on October 1 put into force the decision arrived at two months ago to abolish halfpenny fares. In their place tickets entitling the holder to the same length of journey will be sold at 5 for 3*d.*, 10 for 6*d.* and 20 for 1*s.* Quantities of tickets will be supplied to factories for sale to workmen.

MISCELLANEOUS NEWS AND NOTES.

The Use of Jacks.—For the second time recently a fatality has occurred at Edinburgh in which the deceased became fixed under a tramcar. Jacks had to be sent for from the Shrubhill depôt.

Cars Required at Plymouth.—In order to purchase eight new cars Plymouth Tramways Committee has recommended the Corporation to apply to the Board of Trade for sanction to the borrowing of £8,600.

Standard Broken at its Base.—At Lochee, Dundee, the trolley arm of a tramcar fouled a guard wire attached to a standard on the foot pavement. The standard broke at its base, and in its fall it knocked down a pony.

Extension of Time for New Tramways.—Birmingham Corporation has applied for an extension until September, 1917, of the periods limited by the Corporation's Light Railway Orders of 1912 and 1913 for the completion of the works authorised therein.

The Control of Coal Supplies.—Conversations have taken place between Lord Milner and representatives of the coal owners and miners on the question of the control by the State of coal supplies for the home market, the export trade for our Allies, and the trade in neutral markets.

Passengers' Liability.—As part of an effort that is being put forth at Croydon to avert the loss due to passengers leaving without paying their fares, notices have been placed in the cars warning passengers that if they do not pay they render themselves liable to a penalty of 40*s.*

Oldham District Tramways Company.—An extension of the time allowed for the purchase of the undertaking of the Oldham, Ashton and Hyde Tramways Company is to be applied for by Audenshaw Urban Council, who will act either alone or jointly with the other authorities, as may be necessary.

Seats for Women Conductors.—After the trial of an experimental seat on the platform of one of the cars, Darlington Tramways Committee have decided to have others fixed. The women have stated that they feel a great strain in being called upon to stand for a long number of hours.

Through Running at Plymouth.—Owing to the difficulty in obtaining materials through running between the Plymouth tramways and the newly acquired Devonport section is not expected to be accomplished until the second week in October. It is proposed to bring the universal penny fare into operation at the same time.

Bristol Tramways Purchase Option.—In response to the application of the Tramways Option Committee the Board of Trade have again extended the period during which the Corporation of Bristol may exercise their option of purchase of the Tramways Company's undertaking. The extension is for one year from October next, when the former extension expires.

Prospective Work at Dundee.—Mr. Peter Fisher, the general manager, has reported to the Tramways Committee that seven miles of single track will need renewal after the war, at a cost of about £30,000. Some portion of the work is urgent in character. The Electricity Committee propose after the war to extend the existing power station at an approximate outlay of £90,000.

Volunteer Drivers.—Newcastle, Bradford, Birmingham, Coventry, Portsmouth are the chief places where the tramways departments are receiving valuable assistance from men who are devoting their spare time to the driving of the cars. At Bradford there are nearly sixty volunteer drivers at week-ends and at other busy times. Preliminary instruction in a class room is followed by training on the road on a non-service car prior to undergoing an efficiency examination.

Temporary Overhead Electric Lines.—In reply to a considerable number of applications for consent to the erection of temporary overhead lines for the transmission of electrical energy, the Board of Trade have framed codes of regulations for continuous and alternating current supply. Regulations will be made for each case separately, following these codes. The approval of the Postmaster-General of plans and works must be obtained under section 14 of the schedule of the Electric Lighting (Clauses) Act, 1899.

Women Conductors' Hospitality.—Prior to twenty motormen and conductors leaving the Ayr Corporation Tramways to enter the army, the women conductors gave them a farewell supper, at which Mr. J. Brown, traffic superintendent, presided. The women conductors on the Birmingham Corporation Tramways recently entertained a party of wounded soldiers to a tea and concert at Highgate Road depôt. One of the guests was Sergt. Warder, a motorman and reservist, who has been at the front for two years.

Wind Screens or Vestibules.—The question of adopting either wind screens or vestibules for the protection of the motormen has been engaging the attention of Rochdale Tramways Committee. Mr. G. Webster, the general manager and engineer, has received replies from seventy-one municipal tramways undertakings to questions which he forwarded to them for the purpose of ascertaining which method was most favoured. At the invitation of the Tramways Committee representatives of the drivers are to discuss the matter with a sub-committee.

Period for Altering Fares and Stages at Belfast.—In recommending an extension of the penny stage on the Falls Road tramways, the Belfast Tramways Committee stated that the alteration was not to be made a precedent for the extension of other stages. The stage had been left open specifically at the previous meeting when the annual estimates were adopted. Upon a member moving an amendment for reconsideration of the Committee's statement, the Town Solicitor said Mr. Stephen Ronan (now Lord Justice Ronan) had laid it down two years ago that once the fares and stages were fixed by the Council for the year they must be adhered to. That in his opinion was the true construction of the section. The amendment was defeated by 19 votes to 10.

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Edinburgh Tramways Problem.—The further report of Messrs. J. B. Hamilton, J. A. Brodie and A. H. Campbell on the methods of traction that could be adopted for the tramways in view of the expiration of the company's lease, was presented to the Tramways Committee of Edinburgh Corporation on September 14. In their interim report the three gentlemen named expressed their view that it was not advisable to retain the cable system. At a meeting of the Labour Council on the same day, Councillor Graham said that if the report followed the preliminary report, there would be a disposition to recommend overhead electric, with special underground provision for Princes Street and, if considered necessary or desirable, other thoroughfares. The overhead system was cheap and efficient, and it might be that financial considerations alone would dictate it as the system for Edinburgh. They must decide without delay, for the future development of the city, and especially towards the Rosyth area, was bound up with the problem.

Railwaymen's Bonus Doubled.—As the result of a further conference on September 21 between the railway managers and the employees' representatives, an agreement was reached on the basis that the previous war bonus be doubled, namely, increased to 10s. for employees of 18 and over, and to 5s. for employees under 18, with certain exceptions. As the "Times" remarked in alluding to the agreement editorially, "it is the usual Board of Trade compromise." It concedes half the advance demanded and that as a war bonus and not as an increase in the rate of wages, which it is understood the men desired. It will probably be accepted by the men and the threatened strike in South Wales will be avoided, but it is impossible to regard the result as a good omen or a sign of future tranquillity, for the catastrophe was averted by too narrow a margin and the arrangement is too much of a makeshift to give either railway managers or the public any assurance that the question will not again be reopened. As the State is working the railways it will, of course, have to bear the cost of the concession, which is estimated at seven and a half millions a year.

Car Lighting Restrictions.—An improvement is being made in the method of darkening the tramcars at Glasgow and Dundee, where the windows are obscured by colouring down to within three inches of the base. At Glasgow drivers have mistaken the routes in suburban districts, and passengers have been injured through stepping off before the cars reach their destination. In consideration of the ease with which the entire illumination can be extinguished at the generating station, the authorities have allowed the cars to show more light. As the result of visits that Mr. Fisher, the Dundee manager, has paid to several English cities, he has brought to the attention of the military commander the system of shading and reducing the candle-power of the lights adopted on the Leeds tramcars, thus avoiding painting the windows. Provided that the light is subdued a little more the authorities have agreed to the Leeds method being adopted in Dundee. Unlike many other towns, the Edinburgh authorities have decided that the tramcars shall come to a standstill with all lights extinguished directly warning of an air raid is received. The company have suggested that the cars should be run into the depôts, and the proposal has been remitted to the chief constable for report.

PERSONAL.

Mr. H. S. Ellis, borough electrical engineer at South Shields, has been voted an addition of £50 to his annual salary of £450.

Mr. George Balfour, of Messrs. Balfour, Beatty and Co., Ltd., is one of the new directors added to the board of the Metropolitan Electric Supply Company, on the suggestion of the shareholders' committee.

Mr. A. Nichols Moore, borough electrical engineer of Newport, Mon., has been requested by the Board of Management to the Newport National Shell Factory to act in an advisory capacity to the Board and also to supervise the electrical equipment. The Council, acting upon the recommendation of the Electricity and Tramways Committee, have permitted him to take up these duties.

Mr. R. B. Leach was presented with a smoker's outfit by the staff of Heywood Corporation Tramways and Electricity Department on the occasion of his departure to take up the duties of electrical engineer and manager to Loughborough Council. Accompanying the gift was an address in which the contributors expressed their appreciation of the kindness that Mr. Leach had shown to the staff during his three and a half years' service as manager and engineer.

Melbourne Tramways Board. The Board appointed by the Government of Victoria under the temporary Act for taking over the undertaking of the Melbourne Tramways and Omnibus Company comprises Mr. C. Templeton (chairman), Sir David Hennessy and Sir Henry Weedon (Melbourne City Council), Mr. A. Renfrew (Fitzroy Council), and Mr. F. T. Hickford (Brunswick Council). The Act will remain in force until December 31, 1917, unless an agreement is meanwhile arrived at between the Government and the several municipalities for the constitution of a single authority to control all the city and suburban tramways.

Mr. J. S. D. Moffet, who is shortly leaving West Ham to take up the general management of the Belfast Corporation tramways, was entertained to dinner at the Municipal and County Club, Whitehall, S.W., on Friday evening, September 15, by the Metropolitan Association of Electric Tramway Managers. Among those present were Messrs. W. C. Ullmann (East Ham), chairman of the Association, F. Schofield (Leyton), vice-chairman, Messrs. J. K. Bruce (L.C.C.), L. E. Harvey (Ilford), W. E. Hammond (M.E.T.), J. B. Mackinnon (L.U.T.), T. B. Goodyer (Croydon), Hon. Secretary, H. W. Littler (ex-chairman West Ham Corporation Tramways), H. E. Blain (L.G.O. Co.), and W. T. Robson (Southampton). Letters expressing regret for inability to attend were received from Messrs. A. L. C. Fell and L. Slatterv (L.C.C.), J. C. Williams (Erith), W. Murray (Walthamstow), and A. V. Mason (South Metropolitan).

CONTRACTS AND ORDERS.

Walsall Tramways Committee have accepted the tender of J. Parkinson and Son to supply a lathe, etc.

E. Green and Son, Ltd., have received an order for an economiser and accessories to be supplied to Wakefield electricity works.

West Hartlepool Council has placed an order with the New Conveyor Company for a coal and ash conveyor at the extension of the electricity works that is about to be erected.

Shepherd's Parging Block Company, Ltd., of Milkstone, Rochdale, have received an order from Haslingden Corporation for the supply of block parging for the tramways in the borough.

Hawthorn (Victoria) Tramways Trust has placed the following contracts: Australian General Electric Company and British Westinghouse Company, motor equipment; Horrocks and Roxburgh, Ltd., cross-overs; Messrs. Duncan and Fraser, 15 car bodies.

Portsmouth Tramways Committee have allotted contracts for supplies as appended:—British Thomson-Houston Company, incandescent lamps; British Westinghouse Company, fibre sheet and mica; W. Atkins & Co., tool steel and files and rasps; Pilkington Bros., car side and end glasses and sheet glass; T. H. Harvey, creosote oil and pitch; J. L. Dugud & Co., metal polish; Engelbert & Co., motor gear grease; W. B. Dick & Co., motor bearing, engine, cylinder and cleaning oils; Fleming, Birkby & Goodall, crossovers, terminal clamps, splicing ears, etc., and trolley wheel bushes; F. Smith & Co., span and guard wire; Engineering Supplies Co., plain ears, frogs and span section insulators and controller angers; Gabriel & Co., brake ratchets and hiegnard springs; F. W. Rowlands & Co., car gear wheels and pinions; West Bromwich Spring Co., springs and spring washers; Wm. Brunton & Son, armature binding wire; Smith Bros. & Hill sand tubes, spring washers, motor springs, etc.; Anti-Attrition Metal Co., bushed and unbushed trolley wheels, axle box bearings and key plates; Brommell Patents Co.

FINANCIAL REPORTS AND MEETINGS.

Silverton Tramways.—The report for the half-year to June 30 states that the revenue amounted to £57,210, and, adding £24,000 transferred from reserve No. 2 and £30,002 brought in, the total is £112,121. After deducting expenses and income and other taxes, dividends amounting to £50,000 are declared, carrying forward £27,805.

Bombay Tramways Debentures.—The directors of the Bombay Electric Supply and Tramways Company are asking the 4½ per cent. debenture holders if they would care to sell their stock, and at what price. The company does not bind itself to accept the lowest or any offer. The next interest payment is on January 1, and the last business done, according to the Stock Exchange Official List, was at 83. The price of the stock before the war stood at 96. The issue is redeemable at 105 per cent. in the event of voluntary liquidation, or at the option of the company, on six months' notice, to be given at any time after July 1, 1925, or on the happening of any other event on which the stock is payable.

BUSINESS NOTE.

Britannia Lamps.—Messrs. Dick, Kerr and Company inform us that in future the sale of the Britannia lamp in the United Kingdom will be entirely in the hands of a subsidiary company known as the Britannia Lamp and Accessories Company, Ltd. The latter will incorporate the existing business of Watlington and Company, Ltd., who have hitherto acted as distributors for the Britannia lamp in London and the South of England. This change in the selling arrangements does not in any way affect the manufacture of the Britannia lamp, which will still be made by Messrs. Dick, Kerr and Company at their Preston Works, and they will remain responsible for the quality and performance. All communications in respect to Britannia lamps for use in the United Kingdom should in future be addressed to The Britannia Lamp and Accessories Company, Ltd., Britannia House, 48 Melton Street, London, E.C.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-four of the principal tramway undertakings in the United Kingdom for the week ended September 9 give total receipts of £106,772, or £10,122 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or sixty-nine more than for the corresponding week. The receipts this year were at the rate of £88 4s. 0d per mile of single track, and last year at the rate of £80 7s. 5d., thus showing an increase for the week of £1 17s. 4d. per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. Sept. 21.	A Week Ago.
5%	5%	Alabama Traction, 5% 1st. Mt.	—	67	67½	66
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4¾	70/7½	70/-
4%	4%	Do. 4% Deb. ...	100	91	74	74
4½%	4½%	Do. 4½% Deb. ...	100	98½	76	76
5%	5%	Do. 5% Deb. ...	100	96	75	75
1/-	7d	Auckland Elec. Trams. Ord. ...	1	1⅝	21/-	21/-
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	93⅛	93⅛
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅛	10⅛	10⅛
4½%	4½%	Do. 4½% Deb....	100	96	83	83
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	91⅛	91⅛
$1	$1	Brazilian Trac. & Power Ord. ...	$100	66	60	61½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	92½xd	92½xd
4/-	4/-	Brisbane Elec. Trams. Otd. ...	5	7½	7⅞	7⅞
2/6	2/6	Do. 5% Cum. Pref.	5	5	85/-	85/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	57	55
6%	5%	Do. Pref. Ord....	100	106	60½	57½
5%	5%	Do. 5% Cum. Pref.	100	103	74	71
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	89	89
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	68½xd	68½xd
—	£3	Brit. Elec. Trac. Ord.	100	—	35⅛	35⅛
—	6%*	Do. 6% Cum. Part Pref. ...	100	—	79½	80½
5%	5%	Do. 5% Deb.	100	92	86½	86
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	70½	70
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	82½	82½
3/-	6/6	Calcutta Tramways, Ord. ...	5	7½	6½	6½
1/3	1/3	City of B.A. Trams.	5	5⅛	90/-	89/7½
5/-	4/-	Dublin United Trys 6% Pref.	10	12	11	11½
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	27/-	28/9
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	—	2/1½	2/1½
6/-	6/6	Lanarkshire Trys. Co.	10	10½	9⅝	9⅝
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9½d.	9½d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1½d.	Loud. & Sub. Traction Ord. ...	1	⅛	2/3	2/3
6d.	6d.	Do. 5% Pref.	1	⅛	8/1½	8/1½
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	62½	62½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88½	88½
5%	5%	Do. 5% Inc. Deb.	100	88½	84	81
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	47½	47½
3/-	3/-	Madras Elec. 6% Pref. ...	5	5⅛	96/6	96/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	66⅜	66⅜
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	67½xd	69½xd
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	78	78
$1½	$1½	Mexico Trams. Common ...	$100	70	32	30½
5%	5%	Do. 1 Mt. 5% G.B.	—	84	44½	44½
6%	6%	Do. 6% Mt. Bds.	100	76	35½	35½
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	96½	96½
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95½	95½
1/2*	1/2*	National Steam Car	1	⅛	19/6	19/6
9d.*	9d.*	New General Traction	1	⅛	7/9½	7/9½
6d.	8½d.	Northern Gen. Trans. Ord. ...	1	⅝	15/4½	15/4½
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	70/-	66/-
5%	5%	Do. 5% 1st Deb.	100	89½	74	74
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80⅜	80⅜
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	⅛	11/-	11/-
10d.	8d.	Provincial Trams. Ord.	1	⅝	16/6	16/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84	84
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	92½	91⅜
5%	5%	1st. Mt. 5% 50 yr.	100	89½	82½	82½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	92½	91½
5%	5%	Do. 5% Perp. Deb.	100	99½	81½	81½
—	—	Singapore Elec. Trams	5/-	⅜	4/10½	4/10½
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	96½	96½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	82½	82½
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	93½	94½xd
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	78	78
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	9/3	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	90/-	90/-
—	—	Metropolitan Dist. Ord. ...	100	21½	18	18½
—	—	Undgd. Elec. Rys. of London ...	10	2½	37/10½	37/6
		Do. "A"	1/-	⅜	5/11½	6/-
4½	4½	Do. 4½% Bds of 1933 Rd.	—	99	101½	101⅜
6	6	Do. 6% 1st Cum. In. Db.	100	114	106½	105¾
6	6	Do. 6% In. Bonds Rd. ...	—	88	89⅛	89½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1915	1916	Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	Sept. 16	£47,626	£51,992	38	£1,876,799	— £3,788
Auckland.....(28 days)	Aug. 25	19,876	20,469	8	41,974	— 55
Ballarat and Bendigo ...	July 16	2,677	2,704	16	13,079	+ 905
Brazilian Traction Mlrs.	July	6,703,000	7,195,000	31	47,145,000	+2,757,890
Brisbane	Aug.	35,064	37,900	35	265,130	+ 20,416
British Columbia.....$	July	510,723	538,293	5	538,293	+ 27,570
Buenos Aires Lacroze ...	Aug.	41,468	36,431	9	74,870	— 8,058
Burmah Tramway ... Rs.	Aug.	25 159	24,412	4	24,412	— 747
Calcutta.....Rs.	Sept. 16	67,296	74,403	38	2,509,813	+ 110,893
Cape Town	Aug.	...	13,394	...	...	...
Carthagena & Herrerias..	Aug.	1,523	2,081	35	20,821	+ 6,493
Cordoba	July	14,375	14,263	18	57,313	+ 776
East India	Aug.	2,266	2,522	4	2,522	+ 256
Hong Kong .....$	Aug. 12	11,580	18,822	35	458 667	+ 110,838
Kalgoorlie	June	2,707	2,500	26	14,937	— 1,242
La Plata	Aug.	4,164	3,792	35	33,627	— 357
Lima	Apr.	31.633	33,556	18	134,629	+ 5,614
Lisbon .....Escu.	July	...	206,280	...	...	...
Madras .....(2 weeks)	Sept. 15	30,845	34,552	37	537,998	+ 38,241
Manila	July	23,750	33,700	31	887,739	+ 39,986
Manaos .....Rs.	July	...	152,380	...	...	...
Melbourne	May	...	69,275	...	...	...
Montevideo	July	25,161	25,220	29	266,288	+ 14,435
Pernambuco	Sept. 17	2,880	3,181	37½	114,329	— 3,143
Peruvian .....$	Aug.	819,039	895,900	9	1,731,330	+ 187,453
Port Elizabeth	Aug.	...	2,863	...	...	...
Rangoon	Aug.	4,510	4,253	35	37,191	— 1,693
Shanghai .....$	Sept. 16	26,064	29,952	...	...	...
Singapore .....$	Aug. 12	13,318	13,711	32	399,308	+ 42,717
Toronto.....$	July	773,013	867,789	31	6,202,988	+ 619,912
Winnipeg	July	248,022	242,688	31	1,944,162	— 56,116

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Name.	Week ended	Latest Return. 1915	1916	Incr. or Dec.	Wks.	Aggregate. 1916	Incr. or Dec.
Aberdare U.D.C.	Sept. 5	£343	£407	+ 64	23	£8,954	+ £945
Aberdeen Corporation....	,, 13	1,901	2,041	+ 140	15	30,078	+ 1,297
Accrington Corp.	,, 6	633	663	+ 30	23	13,632	+ 457
Ayr Corporation	,, 11	558	474	— 84	18	9,897	+ 779
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	,, 17	1,464	1,555	+ 91	24½	37,698	+ 3,291
Birmingham Corp.	,, 16	15.530	16,695	+1,165	24	399,782	+ 62,088
Do. Motor Omnibuses	,, 16	990	979	— 11	24	24,299	+ 3,016
Blackburn Corp.	,, 6	1,364	1,323	— 41	23½	30,929	— 912
Blackpool & Fleetwood.	,, 2	1,976	2,352	+ 376	35	31,306	+ 2,978
Blackpool Corp.	*	...	...	...	...	...	...
Bolton Corporation	,, 17	2,774	2,837	+ 63	25	71,988	+ 4,146
Bournemouth Corp.	,, 20	2,509	2,618	+ 109	25	62,101	+ 3,982
Bradford Corporation ...	,, 16	6,689	7,497	+ 808	24	170,923	+ 5,512
Brighton Corporation ...	,, 17	1,386	1,562	+ 176	24½	33,595	+ 3,166
Bristol	,, 15	10,169	11,026	+ 857	37	372 705	+ 16,369
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation	,, 16	1,743	1,850	+ 107	25	43.449	+ 2,163
Burton-on-Trent Corp...	,, 17	308	287	— 21	24	6,726	— 584
Bury Corporation	,, 17	1,410	1,450	+ 40	25½	36,288	+ 1,370
Cardiff Corporation	,, 16	2,914	3,077	+ 163	24	73,970	+ 5,883
Chatham & District	,, 14	1,368	1,420	+ 52	37	45,426	+ 1,923
Chesterfield Corp.	,, 7	283	295	+ 12	23	6,052	+ 265
Colne Corporation	,, 16	358	340	+ 18	...	...	...
Cork Electric	,, 14	577	583	+ 6	37	18,916	+ 190
Croydon Corporation ...	*	...	...	...	...	...	...
Derby Corporation	,, 16	1,104	1,142	+ 38	24½	28,224	+ 1,743
Dover Corporation	*	...	...	...	...	...	...
Dublin & Lucan	,, 15	173	177	+ 4	11	2,119	+ 202
Dublin United	,, 8	6,561	6,739	+ 178	36	216,425	+ 3,072
Dundee City	,, 13	1,466	1,512	+ 46	17½	24,853	+ 715
East Ham Corporation	,, 16	1,351	1,330	— 21	24½	32,534	— 16
Exeter Corporation	,, 15	427	454	+ 27	24	10,010	+ 176
Glasgow Corporation	,, 16	23,117	24,085	+ 968	15⅜	361,139	+ 26,260
Glasgow Subway	,, 16	1,073	1,113	+ 40	37	42,178	+ 3,885
Glossop (U. Elec. Supp.)	,, 16	150	151	+ 1	38	5,249	+ 518
Halifax Corporation	,, 12	2,507	2,412	— 95	23½	56.410	+ 862
Do. Motor Omnibuses	,, 12	53	52	— 1	23½	1,203	— 61
Hastings & District	,, 15	1,389	1,552	+ 163	37	39,718	+ 2,423
Huddersfield Corp.	,, 16	2,687	2,849	+ 162	24	73.238	+ 6,263
Hull Corporation	,, 16	2,983	3,106	+ 122	24	76,202	+ 1,357
Ilford U.D.C.	,, 26	634	695	+ 61	24	17,179	+ 850
Ilkeston Corporation ...	,, 20	147	143	— 4	25	3,579	+ 164
Ipswich Corporation	,, 16	615	553	— 62	24	13,591	— 594
Isle of Thanet	,, 16	735	642	— 93	50	18,847	— 3,111
Kilmarnock Corp.	,, 16	176	182	+ 6	17⅜	3,188	— 7
Lanarkshire	,, 14	2,328	2,586	+ 258	37	85,128	+ 12,975
Lancashire United	,, 13	2,111	2,020	— 91	37	67.116	+ 2,516
Leeds City	,, 16	9,394	9,823	+ 429	25	242.674	+ 20,959
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	,, 16	787	914	+ 127	17⅜	16,133	+ 1,952
Leyton U.D.C.	,, 14	1,649	1,787	+ 138	24	41,557	+ 487
Liverpool Corporation...	,, 9	14,069	14,662	+ 593	36½	508,078	+ 25,557
Llandudno & Colwyn B.	,, 8	605	780	+ 175	40½	14,931	+ 659
London County Council	July 19	40,999	48,584	+1,585	15½	755,621	+ 98,068
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation...	*	...	...	...	...	...	...
Maidstone Corporation..	Sept. 14	259	256	— 3	24	5,436	— 149
Manchester Corp.	,, 16	18,442	18,596	+ 154	24	462,905	+ 25,005
Met. Elec. Trys.	*	...	...	...	...	...	...
National Steam Car.....	*	...	...	...	...	...	...
Nelson Corporation	,, 16	233	239	+ 6	24½	5,355	+ 403
N'castle-on-Tyne Corp.	,, 16	6,541	7,004	+ 463	24	161,631	+ 4,875
Newport (Mon.) Corp.	,, 16	910	1,013	+ 103	24	23.298	+ 2,161
New St. Helens & Dist.	,, 13	1,291	1,130	— 161	11	13,174	+ 255
Northampton Corp.	,, 15	771	725	— 46	24	17.324	— 1,408
Nottingham Corp.	,, 14	3,875	4,063	+ 187	24	94,707	+ 2,452
Oldham Corporation ...	,, 17	2,344	2,414	+ 70	25	64,322	+ 3,762
Portsmouth Corp.	,, 16	2,840	3,370	+ 529	...	...	...
Preston Corporation	,, 13	1,031	1,170	+ 139	23½	26,500	+ 2,941
Provincial	,, 16	2,594	2,951	+ 357	50	116.337	+ 6,642
Reading Corporation	,, 14	843	983	+ 140	23½	20,763	+ 1,147
Rhondda Tramways	Aug. 31	1,252	1,404	+ 152	35	43,228	+ 3,488
Rochdale Corporation...	Sept. 16	1,764	1,799	+ 35	24½	45,271	+ 1,630
Rotherham Corp.	,, 20	1,207	1,682	+ 475	24½	38,273	+ 9,349
Salford Corporation	,, 11	5,667	5,607	— 60	22½	131,763	+ 7,034
Sheffield Corporation.	,, 17	9.329	10,612	+1,283	25½	264.885	+ 41,893
Southampton Corp.	,, 13	1.668	1,900	+ 231	22½	40,525	+ 3,379
Southend-on-Sea Corp...	,, 6	1,074	1,351	+ 277	23	24 460	+ 2,498
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	,, 16	820	869	+ 49	24½	20,764	+ 821
Sunderland Corp.	,, 17	1,516	1,638	+ 122	24	40,618	+ 2,816
Sunderland District...	,, 13	596	713	+ 117	45	28,115	+ 1,892
Swindon Corporation	,, 6	214	240	+ 26	22½	4.752	+ 89
Torquay Tramways.....	,, 7	786	983	+ 197	36	21,562	+ 1,345
Tyneside Trys. & Tmrds.	,, 6	662	713	+ 51	10	7,286	+ 513
Wallasey Corporation ...	,, 16	1,425	1,442	+ 17	24½	35.661	+ 1,892
Walsall Corporation.....	,, 16	828	819	— 9	38	30,556	+ 2,983
Walthamstow U.D.C....	,, 16	960	1,161	+ 201	24	27,948	+ 4,053
Warrington Corp.	,, 14	479	507	+ 28	24	11,846	+ 899
West Ham Corporation	,, 14	3,149	3,268	+ 119	28½	78,727	+ 2,216
Wigan Corporation	,, 14	1,647	1,762	+ 115	24	40,497	+ 3,322
Yorkshire (W. Riding)...	,, 17	1,807	1,806	+ 199	38	66,707	+ 6,101

* Issue of Traffic Returns suspended during the War.

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

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Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

CITY OF BIRMINGHAM.

TRAMWAYS DEPARTMENT.

TENDERS FOR UNIFORM CLOTHING AND CAPS.

The Tramways Committee are prepared to receive Tenders for the supply of Uniform Clothing and Caps for the inspectors, motormen and women conductors.

Forms of tender may be had on application to the undersigned at the Tramway Offices, The Council House, Congreve Street, Birmingham. Tenders must be made on the form provided, and must be handed in not later than 12 o'clock noon on Monday the 6th day of November, 1916.

The Committee do not bind themselves to accept the lowest or any tender.

Persons tendering must at the time of tendering, and at all times during the execution of the works, be paying all their workpeople not less than the standard rate of wages in the districts where such workpeople are actually engaged in the execution of the work, and must be observing the hours and conditions of labour recognised by the Association of Employers and the local bodies of workers in the various trades in such districts. The contractor will be held responsible for the observance of these conditions by any subcontractor employed by him.

The contractor must also agree to comply with and conform to the provisions of the Trade Boards Act, 1909.

ALFRED BAKER,
General Manager.

The Council House,
Congreve Street,
Birmingham.

BURGH OF AYR.

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The lowest or any tender may not be accepted.

P. A. THOMSON,
Town Clerk.

Council Chambers, Ayr.
September 26, 1916.

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G. H. COLLIER,
Director-General of Stores.

POSITIONS VACANT.

COUNTY BOROUGH OF WIGAN.

APPOINTMENT OF BOROUGH ELECTRICAL ENGINEER AND MANAGER.

The Corporation of Wigan invite applications for the position of Borough Electrical Engineer and Manager.

Applications, endorsed "Borough Electrical Engineer and Manager," and accompanied by copies of three testimonials of recent date, stating age, qualifications and experience, must be sent so as to be in the hands of the undersigned not later than October 19.

Particulars of the duties and of the terms and conditions attaching to the appointment may be obtained on application to me.

WILLIAM HENRY TYRER,
Town Clerk.

Municipal Offices,
King Street West, Wigan.
September 22, 1916.

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SATURDAY, SEPTEMBER 30, 1916.

THE RESPONSIBILITY OF COMMITTEEMEN.

Some time has elapsed since attention was last directed in these columns to the lack of appreciation of business principles shown by a member of a tramways committee in addressing a meeting of employees on the question of their conditions of labour. There may be occasions when it is desirable that the chairman of a committee, after consultation with the members of the committee and the general manager, should meet the employees just as is done by the heads of other business organisations; but for a committeeman to do so on his own responsibility is detrimental to the best interests of both the employees and the undertaking. Particularly is this so at a period when the committee are engaged, as at Glasgow recently, in the consideration of wages and hours of work. At a recent meeting of the Glasgow Corporation the chairman of the Tramways Committee effectively criticised such action on the part of a member, and from the applause that followed his remarks it was evident that the great majority of the members were fully in accord with his views. Councillor Montgomery, in expressing his disapproval of any member of the Corporation or of his own committee attending an employees' meeting in reference to such proposals as had been made, rightly described the members of the civic authority as trustees, and asserted that they ceased to be trustees and became partisans when they attended such meetings as that referred to. The chairman added that he made these observations because he considered that the practice struck at the root of all departmental administration, and even at the root of all municipal government. An exceedingly lame reply came from the member who was criticised. While denying that he advocated anything in regard to wages and hours, the councillor said that his object was to urge the employees to become organised, as it was only by organisation that they could hope to better their conditions. Utterly irrelevant was his contention that he was as much entitled to speak to the employees as the general manager was to go to the committee and make suggestions. Cries of "Not at all" greeted this example of confused thinking. As for organisation, the Glasgow employees washed their hands of organisers when a few years ago they were led into a disastrous strike, which for the complete defeat of the disloyal men has since been equalled only at Leeds and London. Without the aid of professional agitators the Glasgow men have since achieved a record of concessions that are not excelled, as regards the hours of work, in any of the more important cities. Particulars will be found in another column of the manner in which the Corporation have decided to meet the employees in the matters of bonus and hours in order to cope with the difficulties created by the war. The terms offered are decidedly generous, and they should be gratifying to the employees.

APPLICATIONS TO TRIBUNALS.

Beeston Tribunal were informed on September 22 that at a private meeting of military representatives the War Office delegate had intimated that only in very exceptional cases should men under 30 be exempted. A million more men would be required before June next, and were thought to be obtainable in this way without raising the age limit.

Although discharged on account of wounds received in the Dardanelles Expedition, a married employee of Bury Corporation Tramways, 30 years of age, was claimed by the military authorities, but the tribunal granted conditional exemption.

At the request of the military representative the Ilford Tribunal have agreed to the review of over 50 exemptions granted to the staff and employees of the Urban Council. The exempted men include the clerk, medical officer of health, tramway manager, surveyor's assistant and chief clerk, and a number of teachers, inspectors, and other employees of various departments.

Three Aberdeen motormen on September 21 asked for exemption on the grounds of conscience, one also claiming that he had passed his 41st birthday. The Army representative stated that his instructions in cases where men had reached their 41st birthday before they were called to the colours, were that they should be returned to the Reserve to meet the contingency of the age limit being raised. This appeal was accordingly withdrawn. The other appeals were dismissed, but the tribunal recommended the men for non-combatant service. The tramways department did not claim any of the men, and regarding two who had not attested it was stated that they would receive no allowances from the Corporation.

Aldershot and District Traction Company has been granted two and three months' exemption for four fitters whose work is to maintain the motor omnibuses in running order, the appeal court having decided that such men are not included in reserved occupations. The tribunal suggested that the work could be done by women, but the company's representative said he had never heard of women who were capable of undertaking it.

Conditional exemption has been granted to the chief inspector of Gloucester Corporation Tramways and three months to an inspector, with leave to apply again in the event of a substitute not being obtainable. The military representative had asked that the second man should join up, but the general manager replied that he did not think he could obtain and train another inspector in three months.

Oldham, Ashton, and Hyde Tramways Company failed to secure exemption for a chief storekeeper.

Conditional exemption until January 1 has been allowed to the depôt foreman employed by Ramsbottom Council Tramways department. The manager said he had been unable to secure an older man, and if this one were taken the car service would probably be stopped.

The Ministry of Munitions has refused to grant badges for the motormen employed by Messrs. Balfour, Beatty, and Company, Ltd., the lessees of Dartford Urban Council Tramways. Consequently the military have made a further call for eligible men. In the case of a motorman, 21 years of age, the company applied to the tribunal for exemption on the ground that he was in a reserved occupation and indispensable. The court allowed two months', and directed that no further appeal should be made unless with the consent of the military representative.

RESTORATION OF NORMAL TIME.

The Home Secretary has issued the following notice:—

"At 3 a.m. (summer time) in the morning of Sunday, October 1, Greenwich time will be restored by putting back the clock to 2 a.m. The hour 2-3 a.m. summer time will thus be followed by the hour 2-3 a.m. Greenwich time. All railway clocks and clocks in Post Offices and Government establishments will be put back one hour, and the Government requests the public to put back the time of all clocks and watches by one hour during the night of Saturday-Sunday, September 30-October 1. Employers are particularly recommended to warn all their workers in advance of the change of time. From October 1 and onwards Greenwich time will be used for all purposes.

"Note.—The hands of the ordinary striking clocks should not be moved backwards. The change of time should be made by putting forward the hands eleven hours and allowing the clock to strike fully at each hour, half hour, and quarter hour, as the case may be. The hands should not be moved while the clock is striking. An alternative method in the case of pendulum clocks is to stop the pendulum for an hour."

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EMPLOYEES' HOURS AND WAGES.

FEDERATION OF LANCASHIRE TRAMWAY AUTHORITIES.

A number of tramway authorities in Lancashire are considering the question of forming a federation to deal with applications for increases of wages. It is stated, however, that there is an obstacle to joint action in the fact that some of the undertakings are governed by the conditions attached to controlled undertakings under the Munitions Act.

Glasgow Corporation on September 19 adopted recommendations by the Tramways Committee that the working hours of drivers and conductors, controllermen and truckmen, sawyers and woodcutters, and abourers and handymen in car works be increased from 51 to 54 per week for the duration of the war, and that the working hours of permanent way labourers, etc., be increased from 51 to 56 per week for the duration of the war. They also agreed that a war bonus of 2s. per week be given to the men and 1s. to the women, while time and a half will be paid for the extra hours worked. Councillor Montgomery, chairman of the committee, stated that the 54 hours week for car hands did not bring them up to the standard of working hours for other tramways. Of 33 undertakings throughout the country only in Aberdeen did the employees work fewer hours; and in the other 32 places the hours were longer than the number hitherto worked at Glasgow. Eight places worked 54 hours, the others worked more than that, 16 working 60 hours and upwards. The committee were compelled to ask the employees to work more hours in order to maintain an adequate service, to reduce the working of a seven days' week, and to enable the employees to earn a little more money. The addition to the wages bill would be £44,408, and the net cost, allowing for the value of the extra three hours' work, would be £25,393. If the proposals were accepted it would follow that other employees of the department would be entitled to receive the same advantages. That would mean an addition of £7,846, so that the total net cost would be £33,240. By the casting vote of the chairman of the Corporation the meeting refused to increase the bonus for women to 2s., although Councillor Kirkland, the ex-chairman of the committee, said that when it was agreed to employ women the committee understood they were to have the same conditions and wages as men. On the same occasion the manager stated that he would not advise the committee to employ women unless they did the same work as men. Councillor Montgomery replied that in the majority of undertakings the practice was not to give the bonus to women.

Concessions to the employees of Lanarkshire Tramways Company came into operation on September 23. Motormen are granted an advance in wages to the extent of 8d. and 9d. per day. An alteration in the working hours has also been intimated, tending to the benefit of the employees.

A deputation of their employees was received by the Bradford Tramways Committee on September 18 in support of their application for higher wages to meet the increased cost of living. The employees are already receiving a war bonus of from 3s. to 4s. per week, and it is estimated that to grant the present request would absorb £21,000 a year. The committee adjourned for a fortnight to enable the general manager to report on certain aspects of the application.

Rochdale Tramways Committee have adopted a recommendation by their sub-committee declining, in view of the heavy commitments of the department, to grant an increase of wages. The report stated that similar applications had been made to other corporations and refused.

An increase of 5s. per week is recommended by York Tramways Committee to the wages of the inspectors, and the manager has been asked to obtain information from other towns as to the number, etc., of inspectors.

CURTAILMENT OF SERVICES.

York Tramways Committee have adopted a recommendation by Mr. J. W. Hame, the general manager, that from October 6 to March 31 the last car from each terminus should start at 10 p.m. instead of 11 p.m. Mr. Hame advised this step on account of the further reduction of public lighting and the approaching shorter periods of daylight. The committee have left it to the manager to cater for later traffic from places of amusement. During the war the Sunday service of the electric omnibuses is to cease owing to the shortage of depôt hands, the present staff having to do the cleaning and overhauling on Saturday nights after their ordinary day's work.

At Norwich the tramway service has been curtailed in the evenings, the last car for all termini now leaving the centre of the city at 9.15.

Barrow Tramways Company have less than a dozen regular motormen for their twenty-six cars, one-third of which are periodically withdrawn for overhauling. A heavy shipyard and munition workers' traffic has to be dealt with every day of the week. Assistance is given to the conductors by placing bell boys on the platforms.

A reference appears in another column to the curtailment of the Cardiff services.

OMNIBUS TRAFFIC IN WORCESTERSHIRE.

In the annual report of Mr. C. F. Gettings, the county surveyor of Worcestershire, on main road and bridge maintenance during the year ended March 31 last, the following paragraph appears:—

"The motor omnibus traffic has continued to increase, some new services being opened and a number of the services already scheduled in previous reports being extended. There are now services over 216 miles of main roads in the county, which is exclusive of roads maintained by borough or urban district councils. As I pointed out in my last annual report the whole of these services have been put into operation since September, 1912. The Local Government (Emergency Provisions) Act, 1916, which includes special clauses relating to the establishment of motor omnibus routes, is now under your consideration. It appears that this Act was brought about more to prevent the immediate extension of motor omnibus services than to establish a principle of contribution towards the upkeep of the roads. Unfortunately this county has been hit very severely in this direction, and, although it is admitted that the services are a convenience to the public, it is a debatable question as to whether the benefits enjoyed are recouped by the county in an indirect manner. There is no doubt that this traffic is one of the most destructive that has ever been put on to the public highway."

Last year a sum of £85,834 was allotted for maintenance, the surveyor's estimate having been reduced by £14,901 in consequence of the shortage of labour and the difficulty of obtaining material. These causes also led to an unexpended balance of £9,572 being carried over to the present year. Mr. Gettings adds that it is quite evident that this reduction of expenditure cannot be continued without serious results, especially as the heavy motor traffic continues to increase, and it is already quite perceptible on many of the roads which have been starved.

The five years' scheme begun in May, 1913, by arrangement with the Road Board, had made only slow progress during the past year owing to the shortage of labour. Attention was mainly confined to the Birmingham and Halesowen road (part Mucklow's Hill), Hagley and Halesowen road, Kidderminster and Hagley road, and Birmingham and Redditch road, all of which had got into an unsafe condition through the heavy motor traffic, and it was imperative that these sections should be proceeded with immediately. The total length of roads reconstructed under this scheme to March 31 last was approximately 25¼ miles. The scheme provides for the strengthening, widening and surfacing with bituminous-bound material of about 53½ miles of main roads, at an estimated cost of £127,000.

MISCELLANEOUS NEWS AND NOTES.

The Motor Tower Wagon of the Oldham Corporation Tramways attended to 581 emergency calls during the past financial year.

Track Reconstruction.—Sanction has been received by Doncaster Tramways Committee for the reconstruction of a portion of the Bentley tramway.

Extension of Time.—The period for the commencement of the works authorised by the West Hartlepool Corporation Tramways Order, 1912, had been extended for 12 months.

Converting Single Truck Cars.—Blackpool Tramways department are converting six of the old type cars into bogie vehicles. The bodies have to be lengthened before the bogie trucks are attached.

Improved Car Lighting at Glasgow.—It is stated that passengers are able to read with ease in the tramcars at Glasgow since a different method of restricting the lighting has been sanctioned by the authorities.

Trolley Arm Accident at Cardiff.—On Sept 23 the trolley wheel of a car left the wire with the result that the arm swung against a standard. The arm broke from its upright base, which was also uprooted. Two passengers on the top deck were injured.

Revenue from Charges for Parcels.—Since the inauguration of the principle of charging for parcels on the Southampton tramcars over 22,000 parcels have been carried, the receipts amounting to £94, which is at the rate of £375 per annum.

Queue System at Wolverhampton.—Success has attended the introduction of the queue system at busy periods at the Prince's Square end of the Wednesfield tramway route. A tramcar inspector and a constable form up the intending passengers.

No Jurisdiction.—Proceedings taken at West Hartlepool police-court against two men on a charge of refusing to pay tramcar fares were dismissed on the ground that the alleged refusal took place at Hartlepool, which is outside of the borough.

Motor Traffic and Tramcar Passengers.—Some uneasiness is felt at Cardiff at the growing tendency of motor cyclists to disregard, in the absence of the police, the order that motor vehicles must draw up while passengers alight from and board tramcars.

Trolley Reversing.—Whitefield Council have called the attention of Bury Corporation to the dangerous practice, during the hours of darkness, of removing the trolley pole at the car terminus, and thus shutting off the light before the passengers have left the car.

Where Free Riding is Impossible.—Sir John Courtis, chairman of Cardiff Tramways Committee, has announced that the Committee are unable to grant free rides to wounded soldiers owing to the congestion of the cars due to only 65 per cent. of them being in service.

Petrograd-Archangel Motor Road.—Several hundreds of American motor-lorries are being run on the 600-mile road constructed to supplement the railway service between Archangel and the Russian capital. The vehicles are stated to have the capacity of a railway wagon.

Damage to Motors by Flooding.—In a report to the Plymouth Works Committee on the escape of flood water from manholes, the borough engineer has stated that in addition to causing inconvenience the flooding impeded tramway traffic, and often damaged the motors of the tramcars. Remedial steps were ordered to be taken.

Rawtenstall and Bacup Increased Fares Dispute.—The foregoing councils recently referred to the Board of Trade their dispute on the matter of tramway fares and stages. Rawtenstall Council contends that the revisions are necessary in order to meet the increased working costs. The selection of the arbitrator has been left to the Board of Trade.

Excess Mileage in Through Running.—As from July last an increased rate per car mile in respect of the excess mileage of the Wolverhampton Corporation cars on the lines of the South Staffordshire Tramways (Lessee) Company and the Wolverhampton District Electric Tramways Company will be paid by the two companies.

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Conductors' Seats.—Brighton Corporation have deleted from the Tramways Committee's report a recommendation against providing seats for the women conductors. The chairman of the committee stated that the girls were allowed to sit in the cars. According to the mover of the exception the two experimental seats were not fixed in the proper place.

Tramway Extension in Geelong.—After the war the Melbourne Electric Supply Company proposes to extend its tramways from the Geelong West terminus to North Geelong and from the South Geelong terminus to Belmont. Before carrying out the latter extension the company requires that the bridge over the Barwon river should be reconstructed. The greater part of the line in Ryrie and Aberdeen Streets is to be duplicated.

Parcels from Oldham to Manchester.—Hitherto a considerable amount of money has been collected by Oldham Tramways parcel department for persons sending parcels from Manchester and other places. With the consent of the Tramways Committee, the general manager has decided not to encourage the collection of accounts. It is proposed to increase the car facilities from a fifteen to a ten minutes' service between the two towns. The Manchester management is to be asked to co-operate in erecting a barrier to regulate loading at Hollinwood.

Ticket Holder Device.—An application was made to the Military Service Act Tribunal for exemption by Conductor H. E. Wright (36), who is employed by West Ham Corporation Tramways department, and is also the maker of a tramcar and omnibus ticket holder. In reply to the Mayor of East Ham, he said he had held the patent three years, and the Mayor and another member observed that the device was a very handy one, especially for the women assistants. The application was refused, but the man was allowed three weeks in which to make arrangements.

Passenger Awarded Damages.—At Liverpool County Court £18 damages was awarded an aged man for injuries sustained in a tramcar accident. His version was that he was in the act of boarding a car at the Old Haymarket, when the conductor rang the bell and the car started before plaintiff had got a footing on it, with the result that he was dragged for some yards, and his left arm was dislocated at the shoulder. The defence was that plaintiff hesitated in boarding the car, and apparently was in the act of stepping back into the road when the accident happened. The conductor said plaintiff admitted that it was his own fault.

Wallasey and the Conductor's Bell.—Notices have been posted in the Wallasey tramcars forbidding passengers ringing the bell or touching any part of the equipment of the car. Critics of the order ask what is to be done when the woman conductor is on the upper deck. The obvious reply is "blow the whistle." Women on the cars in London and elsewhere are as proficient in doing that as they are in trolley reversing or in moving the points on a badly lighted road with motor omnibuses and cars rushing past. At Croydon it is a motorman's duty to change over the trolley.

High Receipts at Blackpool.—During the four weeks ended September 14, the tramway receipts were £18,906, as compared with £14,967 last year, an increase of £3,938, or nearly £1,000 a week. The receipts per car-mile reached 2*s.* 10¾*d.*, an increase of 4*d.* From April 1 to September 14 the receipts were £65,508, as compared with £53,379 last year, an increase of £12,129. The passengers carried numbered 10,230,229, compared with 7,884,432. The takings per car-mile were 2*s.* 2*d.*, an increase of 2½*d.* During August the receipts were about £20,000, or about £1,000 more than the record August of 1913.

The Extra Charge for Coal.—The town clerk of Cardiff has advised the Tramways and Electricity Committee that they are not liable to pay the extra 2*s.* 6*d.* per ton put on coal by order of the Board of Trade. Sir John Courtis and Mr. Arthur Ellis (the manager), take the contrary view that all the contract prices must be increased. The chairman of the Waterworks Committee has expressed his opinion that the new order will not apply in cases where definite contracts have been entered into for supply over a period, but that if coal is being obtained under the Limitation of Prices Act the half-crown increase must be paid.

Gas Fuel for Generating Stations.—The Electricity Committee of Brighton have reported an offer by the British Coalite Company, Ltd., for supplying gas as fuel for the boilers. Some expenditure would be necessary in order to adapt the boilers, etc., but the committee estimate that half of the present cost of fuel would be saved. The company propose to erect a retort and plant for carbonising coal on land adjoining the generating station at Southwick Basin, whither coal is brought by sea. Similar plant is now being installed at Barugh, near Barnsley, and the Yorkshire Electric Power Company has agreed to take and use residual gas as fuel.

Fare Evasion.—In a prosecution of a passenger at Newport for failing to pay an additional fare on demand, Mr. N. J. Young, the tramways manager, stated that these cases were frequent. Many persons paid penny fares and tried to secure a threehalfpenny ride. The Swansea newspapers have published the report of the recent prosecution of a Manchester passenger who was fined 20*s.* for attempting to avoid payment, and who contended that the conductor did not ask for it. A fine of 10*s.* was inflicted in one of four cases in which an inspector of the tramways police at Sheffield prosecuted, while a lad was ordered to pay 8*s.* 6*d.* costs for riding on the step of a car.

Manchester-Bury Through Running.—In reply to Whitefield Council, the Salford Tramways Committee have stated that they do not consider the time now opportune for arrangements to be completed for a through service between Manchester and Bury, but they will be prepared to reconsider the matter at the conclusion of the war. They further point out that they could only maintain their present service under very serious difficulties. To this the Whitefield Council have replied: "That as the matter is one capable of arrangement with the Bury Tramways Committee, the Salford Corporation be informed that this Council do not consider that such through service would necessitate any increase in the number of drivers."

Municipal Electrical Association.—The Editing Committee of this Association have issued at 5*s.* the proceedings of the twenty-first annual meeting, which was held on June 22 and 23 last. The publication extends to nearly 300 pages and serves to present in permanent form the three interesting papers that were read and discussed. The authors and subjects are as appended: Mr. W. W. Lackie, engineer and manager, Glasgow Corporation Electricity Department, "Boiler House Design and Operation"; Mr. H. S. Ellis, borough electrical engineer, South Shields, "The generation of electricity on a small scale or bulk supply"; Mr. W. T. Kerr, city electrical engineer, Hereford, "The application of electricity to agricultural purposes." Each subject has an important economic relation to the national crisis.

Advertising by Photograph.—Some time ago the Underground Railways exhibited in their cars a series of photographs of places of interest in and around London. This scheme has since been greatly extended, so that photographs now form part of the permanent decorations of the car. The practice is to take some place served by the Underground system, and make known to the public its actual attractions by means of an excellent enlarged photograph, the original snapshot being also shown. Thus one series is known as "The way to the sights of London," and shows not only historic buildings, but the familiar figures of the every-day life of the streets. A further series deals with those parts of London's countryside which are within easy access by rail, omnibus or tramcar. The latest pictures in the District cars are framed in the setting of a mahogany panel, which suits them admirably.

Traffic after an Air Raid.—There has never been such heavy traffic on a certain tramway as was the case for two days recently after an air raid. Throughout the hours of daylight the cars were thronged with people using them to reach the scene of damage. A lamentable result of the cowardly visitation in the air in one part of the country was that an inspector, motorman and conductor were killed. The remains of the victims were given a public funeral. Some discussion has taken place of late on the question whether traffic should be stopped during a raid. This is done in many towns. Early in the raids an airship commander was reported in an enemy newspaper to have said that he could see tramcars moving like lighted matches below. Whether this was due to overhead flashes or to the shaded headlights was not stated, but since that statement was published the enemy has adopted the plan of throwing out flares attached to parachutes.

Accidents in Darkened Streets.—A number of mishaps have occurred on tramways during the past few days owing to the restricted street lighting. One man was killed at Sunderland by stepping in front of a tramcar, and another was taken to the hospital unconscious through getting in front of a car coming from the opposite direction after he had passed from behind another car. Newcastle and Gateshead have each had an accident to a pedestrian, with a fatal result in the second mentioned place. At the inquest the coroner said he thought the public should be warned to take extra precautions when crossing streets. Similar fatalities are also recorded from Glasgow and Halifax. It is reported that the Glasgow motormen are given much anxiety on Saturday nights by intoxicated pedestrians. Two Rochdale cars collided at 11 p.m. One car is supposed to have overrun a loop, and before it could be withdrawn a car coming down a slope ran into it. Both motormen were taken to hospital.

Women Drivers and Conductors.—It was reported to Cardiff Tramways Committee on September 19 by Mr. A. Ellis, the general manager, that only 65 per cent. of the cars were being run owing to the difficulty of getting drivers. The pressure was very serious, and the public were complaining of the inadequate service. Mr. Ellis also said there were a large number of claims for damages in cases of cars driven by army-rejected men, but only three small claims had been received in respect of cars driven by women. In his opinion, therefore, it would be better to train more women drivers than to take on men who were not suitable for the work and would, under no circumstances, be made drivers in normal times. The Committee unanimously gave Mr. Ellis authority to train more women drivers, and asked him to report monthly on the position. There are now eight women drivers. Mr. P. Priestley, the general manager at Oldham, has informed the Tramways Committee that he was experiencing considerable difficulty in obtaining women conductors. Other towns, including Manchester and Preston, were also experiencing the same difficulty. Some of the women previously engaged had left to work on munitions, where they could earn higher wages. As there are only eighteen men available for cleaning cars at Oldham the manager has been authorised to arrange a night shift of women. In a case at Tottenham in which a passenger was fined 21*s.* for assaulting a woman conductor, it was stated that over 400 women were employed by the Metropolitan Electric Tramways Company. One of the magistrates observed that he found the conductors to be most obliging. Councillor Montgomery, chairman of Glasgow Tramways Committee, informed the Council on September 21 that women had been employed on the cars since the beginning of April, 1915. Altogether 1,991 women had been engaged, 630 had resigned, and 85 had been dismissed. There were now 1,385 women on the cars, of whom about 150 were drivers. Six women conductors employed by Bath Tramways Company are being trained as drivers under the superintendence of motormen. The company propose to utilise them on the Tiverton route, which is devoid of gradients. In bad weather their outer uniform will comprise a south-wester and a mackintosh.

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PERSONAL.

Mr. G. H. Anger, managing director of the Anger Manufacturing and Supply Company, Limited, of Preston, Lancs., sails for New York on Tuesday next on a business trip to the United States.

The Hon. Elaine Jenkins, the younger daughter of the late Lord Glantawe, has been elected chairman of Swansea and Mumbles Railway Company, after serving the company as a director for some time.

Mr. S. Y. Maling, on leaving the electrical department of Melbourne Corporation to become deputy manager of the Sydney electric supply undertaking, has been presented with several gifts by the Melbourne staff and employees.

Mr. A. T. Lambert, general manager and electrical engineer, Maidstone Corporation Tramways, was accorded a vote of thanks at the September meeting of the Council, "for the great services he has rendered to the undertaking to bring it to its present satisfactory financial position." The Council also expressed the opinion that had not the war arisen the year's trading would have been free from loss. The report presented by the Tramways Committee showed that the deficit had fallen from £2,484 in 1910 to £450, although the charge for energy was 22 per cent. above the sum paid in 1914-15. The Council also expressed their thanks to Councillor D. T. J. Lile, the chairman of the Committee, who in reply said it was a great satisfaction to know that the undertaking was on the way to becoming remunerative.

Mr. Louis Slattery, who for the past five and a half years has been traffic assistant to the chief officer of the London County Council Tramways, was on Tuesday last appointed general manager of West Ham Corporation Tramways. Mr. Slattery began his career as assistant to the general manager at Blackburn in 1891. In 1896 he became general manager to the Blackpool, St. Annes and Lytham Tramways Company, a position which he occupied for several years before being selected to manage the Oldham Corporation Tramways, where he served for six years. Thirty-one applications were received for the vacancy created at West Ham by the removal of Mr. Moffet to Belfast, and seven candidates were interviewed. Ultimately the number was reduced to two, namely Mr. Slattery and Mr. W. Clough, general manager at Bury. The initial salary is £600 per annum.

Sergeant A. Reid, Highland Light Infantry, and formerly a Glasgow motorman, was recently killed by a shell in France.

Mr. James MacMahon, general manager of the Colombo tramways and Lighting Company, Ltd., died at Colombo on September 14.

The Late Bournemouth Borough Engineer.—The Mayor (Alderman H. Robson) has presented the Corporation with an oil painting of the late Mr. F. W. Lacey, borough engineer and surveyor and tramway engineer.

Mr. Hugh M'Michael, treasurer of the City of Edinburgh, died on September 23. For some years he was chairman of the Tramways Committee, in which capacity he assisted in dealing with some difficult questions and improved the relations between the Corporation and the lessees.

CONTRACTS AND ORDERS.

Mansfield Council has placed an order with the General Vehicle Company for a 2-ton battery-propelled wagon, at £1,070.

Luton Council has been recommended by the Electricity and Tramways Committee to place a contract with Messrs. Herbert Morris, Ltd., for an electric overhead runway and two skips for the removal of ashes at the generating station.

FINANCIAL REPORTS AND MEETINGS.

Manaos Tramways and Lighting Company.—The report for the year ended April 30 states that the depreciation of currency has resulted in a loss of £13,093 on remittances from Manaos. The gross earnings were £110,524, as compared with £110,420, and operating expenses £76,172, against £82,240. The net operating revenue carried to profit and loss account increased from £26,180 to £34,352. After providing for debenture interest, sinking fund, interest on loan, London office expenses, sundry charges, and the loss in exchange already referred to, £1,661 is carried to the balance sheet.

United Electric Car Company.—Mr. R. B. Barningham, presiding at the annual meeting at Preston, said that the works had not been working at anything like their full capacity, and only a very few small orders for tramcars had been received. They had had a fair share of Government work in motor and general service wagons and pontoons, but as this was keenly competed for, very little profit could be obtained. The shell work had not turned out profitable, so far, and many of the firms who undertook that kind of work had encountered difficulties they never anticipated. He had good hopes that they would be ultimately paid for the cars they had delivered to South America, but the purchasers were chiefly in occupied territory in Belgium. They proposed to pay the dividend on the preference shares and to carry forward £5,269. As soon as hostilities ceased there would be plenty of work in their particular line both at home and abroad. The great bulk of the cars had been running many years in this country, and they must be renewed shortly. Messrs. R. H. Prestwich and R. S. Boddington were re-elected directors.

Dundee and District Tramways Company.—In moving the adoption of the report at the thirteenth annual meeting, Mr. George Balfour stated that the receipts amounted to £11,825, a decrease of £1,468. There was a decrease in the number of passengers of 125,929. The very severe lighting restrictions affected the volume of local traffic—the short-distance travelling in and between Broughty Ferry and Monifieth—while this was further adversely affected by the unfavourable weather during the early summer. These causes accounted almost entirely for the drop in the receipts. The receipts this year to date showed a considerable improvement. A total of £15 540 debenture stock had been redeemed at July 31 last. The directors proposed to apply each year the interest on redeemed stock in purchasing further stock until the whole had been paid off. This was, in his opinion, the soundest form of providing for depreciation, viz., by actual cash repayment of capital indebtedness out of profits. In his opinion, immediately normal conditions prevailed the company would earn as large or even a larger profit than in any previous year. He moved that a final dividend at the rate of 6 per cent. less income tax, be paid on preference shares for the past half-year. Lieutenant Hynd and Mr. E. Cowan were re-elected directors.

BUSINESS NOTES.

C. A. Vandervell & Co., Ltd., of Acton, W., have published an artistically-printed abridged catalogue of 20 pages. This illustrates and describes the dynamo car-lighting system, which is referred to as "simple, safe, and certain." It is installed on the London County Council's trailer cars. Car illumination by electricity is pre-eminently associated with the name of C. A. Vandervell & Co., who give a guarantee against defects of manufacture. Two pages are devoted to C.A.V. electric horns and klaxon horns. The abridged catalogue will be used until the end of the war, when the complete "Blue Book of Car Lighting" will again appear.

The Edison and Swan United Electric Co., Ponders End, Middlesex, have issued a leaflet illustrating and describing the Ediswan Esco buzzer, which operates on two or ten dry cells. With the aid of a screw adjustment outside the case twelve entirely different tones can be obtained. Its weight is 2 ozs., and its pleasing appearance and penetrating tone make it very useful to replace a bell under the following conditions: (1) In rooms where a large wood box bell is not desired; (2) on indicator boards or inside them; (3) on telephone sets or inside them; (4) in messengers' lobbies, and for lifts, alarms, etc. Another circular deals with Ediswan "H.2.O." cells. This cell was introduced to meet the demand for a wet cell, small and compact; and in this respect it has become one of the most popular on the market. It may be stored for any length of time and in any climate without any deterioration. It is not liable to creeping or evaporation whilst in use. The addition of water only is needed for charging. The company arrange a fixed charge for renovating batteries.

Managers who are concerned with the solid rubber tire department of their motor vehicle service will be interested to know of an illustration of smart service rendered by one of the oldest-established indiarubber manufacturing firms, namely, Messrs. George Spencer Moulton & Co., Ltd. A user within 30 miles of the solid tire department's head office, 239, Deansgate, Manchester, rang up for a quotation. It was specially pointed out that the prompt attention in pressing off old tires and pressing on new ones was imperative, as the inquirer had been harassed through delays caused at some other hydraulic press station. The Spencer Moulton people had their quotation accepted, the wheels sent in and the work finished within a few hours.

Improvements in carburetters have been so great during the last few years that owners of old cars would find it to their advantage to consider the question of having a new carburetter fitted. For instance, Messrs. Lewis & Co., of Leighton Buzzard, have after fitting a Zenith to a 1905 car, improved the consumption to 20 to 25 miles per gallon against 10 to 12 miles per gallon with the old carburetter. In addition they state that the engine now starts easily, runs very slowly when throttled down, pulls up splendidly, and will take quite stiff hills on top gear. The Zenith Company could not undertake to halve the consumption in every case, but this is an instance of what has been achieved by the Zenith on a ten-year-old car.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-four of the principal tramway undertakings in the United Kingdom for the week ended September 16 give total receipts of £193,413, or £10,145 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or sixty-nine more than for the corresponding week. The receipts this year were at the rate of £86 14s. 7d per mile of single track, and last year at the rate of £84 10s. 1d., thus showing an increase for the week of £1 18s. 6d. per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET, LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27, 1914	Cash. Sept. 28.	A Week Ago.
5%	5%	Alabama Traction, 5% 1st. Mt.	—	67	68½	67½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4¾	70/1½	70/7½
4%	4%	Do. 4% Deb. ...	100	91	74	74
4½%	4½%	Do. 4½% Deb. ...	100	98½	79½	76
5%	5%	Do. 5% Deb. ...	100	96	74½	75
1/-	7d.	Auckland Elec. Trams. Ord. ...	1	1⅛	21/-	21/-
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	94	93½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11½	10½	
4½%	4½%	Do. 4½% Deb....	100	96	83	83
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	91½	91½
$1½	$1½	Brazilian Trac. & Power Ord....	$100	66	59½	60
$1½	$1½	Do. 6% Cum. Pref.	$100	97	92xd	92½xd
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	7⅞	7⅞
2/6	2/6	Do. 5% Cum. Pref.	5	5	85/-	85/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	60½	57
6%	5%	Do. Pref. Ord....	100	106	61½	60½
5%	5%	Do. 5% Cum. Pref.	100	103	75	74
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	89	89
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	90½	68½xd	68½xd
—	£3	Brit. Elec. Trac. Ord.	100	—	30	35½
—	6%*	Do. 6% Cum. Part Pref. ...	100	—	79½	79½
5%	5%	Do. 5% Deb.	100	92	86½	86½
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	70½	70½
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	81½	82½
3/-	6/9	Calcutta Tramways, Ord. ...	5	7½	6½	6½
1/3	1/3	City of B.A. Trams.	5	5½	90/-	90/-
5/-	4/-	Dublin United Trys 6% Pref. ...	10	12	11½	11
5%	5%	Hong Kong Trys. 5% Mt. Dbs. ...	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref.	5	2½	27/6	27/-
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	1	2/1½	2/1½
6/-	6/6	Lanarkshire Trys. Co.	10	10½	9/3	9/3
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9½d.	9½d.	Llandudno & Colwyn B. Ord. ...	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	1½	2/4½	2/3
6d.	6d.	Do. 5% Pref.	1	1½	8/-	8/1½
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	62½	62½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	85½	86½
5%	5%	Do. 5% Inc. Deb.	100	88½	84	84
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	47½	47½
3/-	3/-	Madras Elec. 6% Pref.	5	5⅛	99/6	96/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	66½	66½
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	67½xd	67½xd
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	78	78
$1½	$1½	Mexico Trams. Common	$100	70	31½	32
5%	5%	Do. 1 Mt. 5% G.B.	—	84	44½	44½
6%	6%	Do. 6% Mt. Bds.	100	76	35½	35½
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	94½	96½
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95½	95½
1/2*	1/2*	National Steam Car	1	½	19/10½	19/6
9½d.*	9½d.*	New General Traction	1	¼	7/9½	7/9½
6d.	8½d.	Northern Gen. Trans. Ord. ...	1	¾	15/4½	15/4½
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	70/-	70/-
5%	5%	Do. 5% 1st Deb.	100	89½	74	74
5%	5%	Portland Rv. 5% 1st Mt. 30 yr.	—	96	80½	80½
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	½	11/3	11/-
8½d.	8d.	Provincial Trams. Ord.	1	¼	17/-	16/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84	84
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	92	92½
5%	5%	1st. Mt. 5% 50 yr.	100	89½	84	82½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	92½	92½
5%	5%	Do. 5% Terp. Deb.	100	99½	81½	81½
—	—	Singapore Elec. Trams	5/-	¼	4/10½	4/10½
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	96½	96½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	82½	82½
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	95	93½
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	79	78
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	¼	9/3	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4½	90/-	90/-
—	—	Metropolitan Dist. Ord. ...	100	21½	15	15
—	—	Undgd. Elec. Rys. of London ...	10	2½	37/9	37/10½
		Do. "A"	1/-	¼	6/-	5/11½
4½	4½	Do. 4½% Bds of 1933 Rd.	—	99	101	101½
6	6	Do. 6% 1st Cum. In. Db.	100	114	106½	109½
6	6	Do. 6% In. Bonds Rd. ...	—	88	89½	89⅞

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1915	1916	Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	Sept. 23	£50,319	£50,087	39	£1,926,886	— £4,000
Auckland.....(28 days)	Aug. 25	19,576	20,469	8	41,974	— 55
Ballarat and Bendigo ...	July 16	2,677	2,704	16	13,079	+ 905
Brazilian Traction Mlrs.	Aug.	6,576 000	7,184,000	35	54,329,000	+3,365,890
Brisbane	Aug.	35,064	37,900	35	265,130	+ 20,416
British Columbia.....$	July	510,723	538,293	5	538,293	+ 27,570
Buenos Aires Lacroze ...	Aug.	41,468	36,431	9	74,870	— 8,058
Burmah Tramway ... Rs.	Aug.	25 159	24,412	4	24,412	— 747
Calcutta.....Rs.	Sept. 23	64,610	67,862	39	2,577,675	+ 120,145
Cape Town	Aug.	...	13,394	...	...	...
Carthagena & Herrerias..	Aug.	1,523	2,081	35	20,821	+ 6,493
Cordoba	July	14,375	14,203	18	57,313	+ 776
East India	Aug.	2,266	2,522	4	2,522	+ 256
Hong Kong .....$	Aug. 26	11,467	15,115	37	491,805	— 120,692
Kalgoorlie	July	2,775	2,521	31	17,458	— 1,496
La Plata	Aug.	4,164	3,792	35	33,627	— 357
Lima	Aug.	32,004	33,395	35	276,710	+ 12,959
Lisbon .....Escu.	July	...	206,280	...	...	...
Madras .....(2 weeks)	Sept. 15	30,845	34,552	37	537,998	+ 38,241
Manila	July	23,750	32,700	31	887,739	+ 39,986
Manaos .....Rs.	July	...	152,380	...	...	...
Melbourne	May	...	69,275	...	...	...
Montevideo	July	25,161	25,220	39	266,288	+ 14,435
Pernambuco	Sept. 24	2,785	3,145	38	114,474	— 2,783
Peruvian .....$	Aug.	819,039	895,900	9	1,731,330	+ 187,453
Port Elizabeth	Aug.	...	2,863	...	...	...
Rangoon	Aug.	4,510	4,253	35	37,191	— 1,693
Shanghai .....$	Sept. 16	26,064	29,952	...	...	...
Singapore .....$	Aug. 19	11,630	13,837	33	413,145	+ 44,92[illegible]
Toronto.....$	July	773,013	867,789	31	6,202,988	+ 649,91[illegible]
Winnipeg	July	248,022	242,688	31	1,944,162	— 86,11[illegible]

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Name.	Week ended	Latest Return. 1915	1916	Incr. or Dec.	Wks.	Aggregate. 1916	Incr. or Dec.
Aberdare U.D.C.	Sept. 19	£343	£408	+ 65	25	£9,770	+ £1,076
Aberdeen Corporation...	,, 20	1,673	1,854	+ 181	16	31,932	+ 1,429
Accrington Corp.....	,, 20*	617	624	+ 7	25	14,854	+ 471
Ayr Corporation	,, 23	340	376	+ 35	19	10,273	+ 815
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.....	,, 24	1,422	1,610	+ 188	25½	39,300	+ 3,490
Birmingham Corp.	,, 23	15,406	16,388	+ 983	25	416,170	+ 63,072
Do. Motor Omnibuses	,, 23	946	960	+ 13	25	25,260	+ 3,030
Blackburn Corp.	,, 20	1,563	1,375	— 188	25½	35,720	— 1,118
Blackpool & Fleetwood.	,, 2.	1,976	2,352	+ 376	35	31,306	+ 2,078
Blackpool Corp.	*	...	...	...	...	...	...
Bolton Corporation.....	,, 24	2,678	2,963	+ 285	26	74,050	+ 4,431
Bournemouth Corp.....	,, 27	2,168	2,432	+ 264	26	64,583	+ 4,196
Bradford Corporation ...	,, 23	6,468	6,572	+ 104	25	177,495	+ 5,616
Brighton Corporation ...	,, 24	1,278	1,386	+ 108	25½	34,981	+ 8,274
Bristol	,, 22	9,761	10,516	+ 755	38	83,221	+ 17,124
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	,, 23	1,576	1,738	+ 162	26	46,187	+ 2,325
Burton-on-Trent Corp...	,, 24	300	291	— 9	25	7,017	— 593
Bury Corporation.....	,, 24	1,487	1,543	+ 46	26½	37,822	+ 1,416
Cardiff Corporation.....	,, 16	2,914	3,077	+ 163	24	73,970	+ 5,883
Chatham & District.....	,, 21	1,377	1,378	+ 1	38	46,804	+ 1,924
Chesterfield Corp.	,, 16	292	274	— 18	24	6,927	+ 247
Colne Corporation	,, 23	255	278	+ 23	...	...	...
Cork Electric	,, 21	559	527	— 32	38	19,443	+ 158
Croydon Corporation ...	*	...	...	...	...	...	...
Derby Corporation	,, 23	1,072	1,120	+ 48	25½	29,345	+ 1,701
Dover Corporation	*	...	...	...	...	...	...
Dublin & Lucan	,, 22	179	154	— 25	12	2,273	+ 177
Dublin United	,, 22	6,469	6,269	— 200	38	229,496	— 3,184
Dundee City	,, 20	1,370	1,386	+ 16	18½	26,240	+ 726
East Ham Corporation	,, 23	1,296	1,313	+ 17	25½	33,848	+ 2
Exeter Corporation.....	,, 22	408	439	+ 31	26	10,449	+ 207
Glasgow Corporation	,, 23	22,277	23,450	+ 1,173	18½	384,589	+ 27,294
Glasgow Subway.....	,, 23	1,077	1,097	+ 20	38	41,275	+ 3,904
Gossop (U. Elec. Supp.)	,, 23	150	150	nil	39	5,300	+ 518
Halifax Corporation.....	,, 19	2,214	2,191	— 22	24½	58,601	+ 839
Do. Motor Omnibuses	,, 19	50	51	— 1	24½	1,254	— 60
Hastings & District.....	,, 22	1,273	1,329	+ 56	38	41,047	+ 2,480
Huddersfield Corp.	,, 23	2,674	2,806	+ 132	25	76,044	+ 6,395
Hull Corporation	,, 25	3,078	3,028	+ 50	25	79,230	+ 1,307
Ilford U.D.C.	,, 26	634	695	+ 61	24	17,179	+ 850
Ilkeston Corporation ...	,, 20	147	143	— 4	25	3,579	+ 164
Ipswich Corporation	,, 23	587	514	— 73	25	14,106	— 677
Isle of Thanet	,, 23	536	494	— 42	51	19,341	— 3,152
Kilmarnock Corp.	,, 23	162	177	+ 15	18½	3,364	+ 8
Lanarkshire	,, 21	2,172	2,491	+ 319	38	87,619	+ 13,204
Lancashire United	,, 20	1,889	1,898	+ 9	38	69,038	+ 2,492
Lee Is City.....	,, 23	9,084	9,990	+ 906	26	252,064	+ 21,986
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	,, 23	795	856	+ 61	18½	16,989	+ 2,014
Leyton U.D.C.....	,, 21	1,641	1,771	+ 130	25	43,428	+ 617
Liverpool Corporation...	,, 22	13,978	14,219	+ 241	38½	536,663	+ 25,959
Llandudno & Colwyn B.	,, 22	437	547	+ 110	42½	16,114	+ 881
London County Council	*	...	...	...	...	...	...
London Genl. Omnibus	*	...	...	...	...	...	...
London United.....	*	...	...	...	...	...	...
Lowestoft Corporation...	*	...	...	...	...	...	...
Maidstone Corporation..	,, 21	251	243	— 8	25	5,679	— 157
Manchester Corp.....	,, 23	18,408	18,501	+ 93	25	481,406	+ 25,159
Met. Elec. Trys.	*	...	...	...	...	...	...
National Steam Car.....	*	...	...	...	...	...	...
Nelson Corporation	,, 23	186	209	+ 23	25½	5,564	+ 425
Newcastle-on-Tyne Corp.	,, 16	6,541	7,004	+ 463	24	161,031	+ 4,875
Newport (Mon.) Corp....	,, 23	865	967	+ 102	25	24,265	+ 2,263
New St. Helens & Dist.	,, 20	1,149	1,000	— 149	12	14,375	+ 290
Northampton Corp.....	,, 22	732	731	— 1	25	18,055	— 1,409
Nottingham Corp.....	,, 21	3,739	4,084	+ 345	25	98,792	+ 2,797
Oldham Corporation	,, 24	2,336	2,512	+ 176	26	66,833	+ 3,937
Portsmouth Corp.....	,, 16	2,840	3,370	+ 529	...	...	...
Preston Corporation.....	,, 20	984	1,122	+ 138	24½	27,623	+ 3,070
Provincial	,, 23	2,420	2,547	+ 127	51	118,884	+ 6,716
Reading Corporation.....	,, 21	829	909	+ 80	24½	21,672	+ 1,226
Rhondda Tramways.....	,, 21	1,263	1,410	+ 147	38	48,572	+ 4,068
Rochdale Corporation...	,, 23	1,768	1,791	+ 23	25½	47,063	+ 1,655
Rotherham Corp.....	,, 27	1,189	1,789	+ 600	25½	40,061	+ 9,949
Salford Corporation.....	,, 25	5,283	5,611	+ 328	24½	142,744	+ 7,175
Sheffield Corporation....	,, 24	9,373	10,752	+ 1,379	26½	275,637	+ 43,263
Southampton Corp.....	,, 20	1,666	1,767	+ 76	24½	42,262	+ 3,455
Southend-on-Sea Corp...	,, 20	908	1,054	+ 146	25	26,730	+ 2,878
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.....	,, 23	799	864	+ 65	25½	21,628	+ 909
Sunderland Corp.....	,, 24	1,493	1,679	+ 186	25	42,297	+ 3,002
Sunderland District...	,, 20	544	640	+ 96	46	28,755	+ 1,988
Swindon Corporation ...	,, 6	214	240	+ 26	22½	4,752	+ 89
Torquay Tramways.....	,, 21	721	815	+ 94	38	23,328	+ 1,618
Tyneside Trys. & Tmrds.	,, 20	594	654	+ 60	12	8,649	+ 615
Wallasey Corporation ...	,, 23	1,321	1,351	+ 30	25½	37,013	+ 1,922
Walsall Corporation.....	,, 23	801	848	+ 47	39	31,404	+ 3,030
Walthamstow U.D.C....	,, 23	913	1,110	+ 197	25	24,837	+ 4,222
Warrington Corp.....	,, 14	479	507	+ 28	24	11,846	+ 809
West Ham Corporation	,, 21	3,114	3,243	+ 129	24½	81,970	+ 2,345
Wigan Corporation	,, 14	1,047	1,762	+ 115	24	40,497	+ 3,322
Yorkshire (W. Riding)...	,, 24	1,566	1,894	+ 328	39	68,601	+ 6,429

* Issue of Traffic Returns suspended during the War.

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(*January* 13, 1916.)

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CHAPTER V.—RAIL PACKING.

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CHAPTER VIII.—JOINT WELDING.

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CHAPTER XIII.—RECONSTRUCTION.

Removal of tracks—Temporary tracks.

CHAPTER XIV.—SURFACE DRAINAGE AND RAIL MAINTENANCE.

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

CITY OF BIRMINGHAM.

TRAMWAYS DEPARTMENT.

TENDERS FOR UNIFORM CLOTHING AND CAPS.

The Tramways Committee are prepared to receive Tenders for the supply of Uniform Clothing and Caps for the inspectors, motormen and women conductors.

Forms of tender may be had on application to the undersigned at the Tramway Offices, The Council House, Congreve Street, Birmingham. Tenders must be made on the form provided, and must be handed in not later than 12 o'clock noon on Monday the 6th day of November, 1916.

The Committee do not bind themselves to accept the lowest or any tender.

Persons tendering must at the time of tendering, and at all times during the execution of the works, be paying all their workpeople not less than the standard rate of wages in the districts where such workpeople are actually engaged in the execution of the work, and must be observing the hours and conditions of labour recognised by the Association of Employers and the local bodies of workers in the various trades in such districts. The contractor will be held responsible for the observance of these conditions by any subcontractor employed by him.

The contractor must also agree to comply with and conform to the provisions of the Trade Boards Act, 1909.

ALFRED BAKER,
General Manager.

The Council House,
Congreve Street,
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G. H. COLLIER,
Director-General of Stores.

POSITIONS VACANT.

COUNTY BOROUGH OF WIGAN.

APPOINTMENT OF BOROUGH ELECTRICAL ENGINEER AND MANAGER.

The Corporation of Wigan invite applications for the position of Borough Electrical Engineer and Manager.

Applications, endorsed "Borough Electrical Engineer and Manager," and accompanied by copies of three testimonials of recent date, stating age, qualifications and experience, must be sent so as to be in the hands of the undersigned not later than October 19.

Particulars of the duties and of the terms and conditions attaching to the appointment may be obtained on application to me.

WILLIAM HENRY TYRER,
Town Clerk.

Municipal Offices,
King Street West, Wigan.
September 22, 1916.

MUNICIPALITY OF PORT ELIZABETH (SOUTH AFRICA).

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SAM FAY, General Manager.

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Tramway AND Railway World

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SATURDAY, OCTOBER 7, 1916.

THE DANGER BY NIGHT.

Continents have had to be aflame with war before we in these little islands could adopt a number of common-sense regulations that conduce to the safety of vehicular and pedestrian traffic, and even yet the restrictions do not cover the whole ground. Negligence in this respect has been the subject of agitation, both in and out of Parliament, by tramway managers and automobilists for many years; and there is still work to be done to secure complete safety. Drovers and shepherds are not yet compelled to carry a red light when they are driving their charges on the roads at night. This is a danger affecting tramway and motor omnibus owners as much as it does the private motorist. Indeed, at the present time when pleasure traffic is reduced to a minimum, both on account of the restricted lighting and the need for economy in the consumption of petrol, it is probable that public passenger vehicles are more largely interested in the question than the individual car owner. There are whole counties where omnibus services constitute a network on urban and rural roads, both for ordinary traffic and the transport of munition workers. On the other hand, thousands of the ordinary type of car are in voluntary service for the conveyance of naval and military officers, while at all hours ambulances are in use for carrying the wounded from train to hospital. On top of all this there is the anti-aircraft motor service. If the Whitehall authorities will only give these important facts a minute's consideration, they must be convinced of the necessity of completing the more efficient lighting regulations of vehicles already enforced by means of the Defence of the Realm Act. When the enemy began his attacks in the air the Cabinet by a stroke of the pen under that Act achieved for public safety a triumph that motoring interests had struggled for in vain in the Legislature. Horse vehicles were brought into line with motorcars by requiring them to display three lamps, one of which must give a red light to the rear. The latter requirement was also imposed upon cyclists, who had long ridiculed the demands made by motorists for the institution of so useful a reform. In another column a report is given of the prosecution of an Aberdeen motorman on a charge of driving a car recklessly and carelessly and killing and injuring a number of sheep. It would have been opposed to every idea of justice if the man had been convicted at this time when it is impossible for a driver to see more than three or four yards ahead. A fitting sequel to the collision would have been a charge against the shepherd of driving his sheep to the public danger. The man did have the sense to admit, in reply to the defending solicitor, that "it would have been better if he had carried a red light ahead of the flock." Tramway and motoring organisations must make it their business to press at once for the addition of a clause embodying that requirement, for the necessity of the safeguard is widespread.

REMODELLING WORN RAILS.

The rails on two tramway routes at Wigan are being remodelled by the Woods-Gilbert Rail Planer Company. Alderman R. T. Fletcher, chairman of the Tramways Committee, at the September meeting of Wigan Corporation, said that those two routes (Martland Bridge and Scholes) would shortly have required reconstruction at an estimated cost of £33,458. At the suggestion of Mr. A. T. Gooseman, the permanent way engineer, the Committee investigated the claim that by the use of the rail planer the life of the rails could be prolonged. The committee decided to use it, and as a result the two routes had been practically remodelled, and at the very minimum three years' life had been added to the tracks. When the deputation went to Ashton-under-Lyne, where the rail planer had been used two and a half years before, the Wigan engineer and the Ashton-under-Lyne engineer together came to the conclusion that there was still two-and-a-half years' life in the track, so that the life of the Ashton-under-Lyne tramway track had been extended by not three but five years. He supposed everything depended upon the amount of weight and traffic going over the lines after being remodelled as to how long the track would last, but the cost of remodelling in Wigan was coming out of revenue. The committee had made arrangements to keep the Woods-Gilbert rail planer in Wigan to go over all the tracks. The whole of the position in regard to the tramway undertaking was changed in consequence of the foresight on the part of the engineer, good management on the part of the tramways manager, Mr. F. Buckley, and loyal service on the part of the staff, whilst the fatal day for reconstruction was postponed anything from three to five years. If it had not been for this, the tracks would have been worn out, although payment of the loan for them would not have been made until 1930.

As readers of THE TRAMWAY AND RAILWAY WORLD are aware, the Wood-Gilbert process has been available for several years; but it is only recently that its undoubted value has begun to be recognised in this country. It is now being applied on the Cardiff Corporation and the Bexley Heath Council tramways, in addition to the Wigan lines, and a number of other authorities will, we believe, soon decide to make use of it.

TRAFFIC DURING RESTRICTED LIGHTING.

The Metropolitan Police have directed tramway authorities to carry out to the full extent the new Lights on Vehicles Order. Experimental cars are already running on the London tramways. Two white lights are required at each corner of the top deck in front and one red light at the rear offside corner. It is estimated that the work will entail an expenditure of £2 per car.

Motormen on the Birmingham Corporation cars have made representations to the management setting forth the need for more light on the cars from the point of view of public safety. Councillor Harrison Barrow, the chairman of the Tramways Committee, has approached the Watch Committee on the question, and he has stated that if some modification cannot be secured the Tramways Committee will have to consider the advisability of stopping the services at an earlier hour.

A few nights ago the Glasgow tramways department made an experiment to test the arrangements for extinguishing the car lights in the event of a raid. At 9.18 p.m. the general manager gave the order for the power to be shut off at the generating station, and two minutes later all the cars were at a standstill. Candles were then lighted in each car. The order to restore the power was given at 9.25, and at 9.28 the cars were in motion.

York Corporation have agreed to a recommendation by the Tramways Committee that the last cars shall start at 10 p.m. instead of 11 p.m. This curtailment is rendered necessary by the difficulty experienced in staffing the cars. The manager is considering the advisability of fixing coloured lights to the front of the cars to enable intending passengers to see to which terminus the vehicles are proceeding.

On October 2 a curtailment of the services was instituted on the Llandudno and Colwyn Bay Electric Railway, the last cars now running at periods between 9.45 and 11 p.m. The company have announced that on account of the lighting and other difficulties there will probably be further restrictions at a later date.

At Yarmouth several services now terminate at 7 p.m. but the cars to Caister run up to 9.30 p.m.

All services at Lowestoft cease at 8 p.m. as from October 1.

The Douglas (Isle of Man) cars now stop running at 9.10 p.m.

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TRAMCAR ACCIDENTS.

Questions of contravention of a regulation forbidding a motorman to leave his car on Stow Hill, and the probable insufficient application of an air brake are involved in a double collision that occurred at Newport about 9 p.m. on September 30. Car No. 42 was being driven down the hill at a moderate pace, and when on the sharp curve collided with No. 43, which was going up-hill on the single line. The drivers had already put on the brakes, and the impact was not severe. The collision is attributed to the driver of Car 42 overrunning his signal, as the conductor of this car stated that on entering the loop on the down journey the signal was against them. This is confirmed by the statement of the conductor of Car 43 that she herself set the signal against the down car. Car 42 was then backed into the loop, when the motorman, apparently seeing the other driver in difficulties, left his car and went to ascertain the cause. Almost immediately the unattended car began to move down the gradient, and it collided with the other car for the second time. Car 43 was knocked across the track and against a wall, pinning the dismounted driver there and fracturing his thigh. In the temporary absence of Mr. N. J. Young, general manager, the work of removing the cars was directed by Mr. A. Nichols Moore, the electrical engineer. That gentleman has stated that in his opinion the cause of the car starting off a second time was probably due to the motorman not having the air brake properly on. Mr. Moore found that the slipper brake was off. This was probably done when the driver backed the car up the hill, and he must have omitted to put it on again when the car came to a standstill. On Car 42 the air brake was found in the neutral position.

A singular cause led to a Brighton tramcar running away in the absence of the motorman on September 30. A passenger boarded a car at the central railway station at the driver's end, and in placing a portmanteau on the platform it sounded the gong. In the belief that it was the motorman's starting signal the woman conductor released the rear hand brake, whereupon the car began to run down the gradient. The conductor, on noticing the absence of the driver, did all that she could to arrest the progress of the car before it reached the curve leading into North Road, but at that point it left the rails and ran against a building. None of the twelve persons on the car were injured.

A Leeds tramcar proceeding to Wortley on September 27 ran past the Greenside loop owing to the slippery rail. Running down the single line it collided with a car that was returning to the city. The cars became interlocked and ran down the gradient to the terminus half a mile distant. There they left the rails but did not overturn. A score of passengers were injured, but none seriously.

While a Glasgow car, driven by a woman, was at the junction of Dumbarton and Crow Roads on September 30, it jumped the points, ran across the street and came to a standstill against a shop. The driver sustained a shock.

APPLICATIONS TO TRIBUNALS.

Mexborough and Swinton Tramways and Electric Lighting Company have been granted conditional exemption for their general manager and also for the only linesman left.

The Aldershot Tribunal have granted a fourth period of three months' exemption for the secretary of the Aldershot and District Traction Company, the applicant being 31 years of age. An appeal for an inspector was not allowed. A final exemption for one month was allowed for two omnibus drivers while a third driver was allowed a month in which to obtain a badge or be replaced.

An application was made to the Leicester Tribunal by the general secretary of the Association of Tramway and Vehicle Workers for the exemption of the secretary of the local branch. The man had held his position for seven years and it was alleged that he could not be replaced. Further, it was stated that his name was inadvertently overlooked when the Association's list of applicants for exemption was sent to the Trade Union Congress. Three months' exemption was allowed.

Exemption until December 31 has been granted for an inspector employed by Exeter Corporation Tramways department.

Although a clerk employed by the Middlesbrough, Stockton, and Thornaby Tramways Company was described as indispensable, the Stockton Tribunal granted exemption only to January 1.

A Hull tramways employee, 31 years of age, who stated that he acted as motorman and conductor at different times, was allowed until November 1. At the time he entered his appeal he was acting as a conductor only.

REQUESTS BY EMPLOYEES.

At a meeting of the Bradford Corporation Tramways Committee on October 2, Councillor E. Priestley presiding, further consideration was given to the application of the employees for a revision of the entire scale of wages, involving a substantial increase on present rates. The men are at present receiving a war bonus of from 3s. to 4s. a week, and a revision of the wages scale in accordance with the proposal of the employees would cost, it is estimated, £21,000 a year. There are over a thousand workers, whose application for an advance is put forward on the ground of the increased cost of living. The Bradford city tramways being a certified undertaking, the committee, after considerable discussion, decided to refer the question for hearing and settlement to the Ministry of Munitions Committee on Production.

The Association of Tramway Workers in Lancashire and Cheshire, have decided that all branches should send in an application to the tramway committees for a wage which they consider should be fixed as a standard for Lancashire. It was further decided that effective machinery should be brought into existence to deal with the new situation created by the proposed foundation of the federation of Corporation Tramway Committees.

An advance of 5s. per week in their wages has been granted to the inspectors on the York Corporation tramways. A member of the Council expressed the opinion that there were too many inspectors, but Alderman S. W. Meyer, chairman of the Tramways Committee, said there were too few of them for the proper conduct of the traffic.

RELAXATION OF PETROL RESTRICTIONS.

Petrol allowances on a more generous scale are to be granted to private motorists and to motor-cyclists when the new licences are issued this month. The new regulations were issued on October 4 by the Petrol Control Committee, and provide that all owners of private cars can obtain a minimum of 16 gallons a month for the six months November to April on making application for that quantity. Owners holding a licence or licences for a total supply exceeding 16 gallons per month "cannot for the present be granted any increase on their existing licences." Owners of motor-cycles are to be allowed 2 or 4 gallons a month, as they may prefer, but their licences will be for five months only, from November to March.

The Committee state that applications for new licences, which should be made on the form attached to the present licence, must be sent to the secretary, Petrol Control Committee, 19, Berkeley Street, London, W., when the licence is nearly exhausted, but not before October 9. The amount of the duty payable (£2 8s. for 16 gallons in the case of motor-car owners, and 5s. or 10s. on the case of motor-cyclists) should accompany the application.

If more petrol is available for private use, it is clear that more must be forthcoming for industrial use, and the secretary of the Commercial Motor Users' Association understands that the Committee intend to increase the allowance to commercial users by 20 per cent. in November. This would give them 80 per cent. of their normal requirements. We indicated a few weeks ago that the restrictions imposed were being found unnecessarily stringent and foreshadowed an early relaxation.

MISCELLANEOUS NEWS AND NOTES.

Cars for Wounded Soldiers.—An inquiry bureau managed by a Bristol newspaper is defraying the cost of providing special tramcars for soldiers under treatment in the local hospitals.

Halfpenny Fares.—Kirkcaldy Council have abolished the halfpenny fare, but by 12 votes to 11, have ordered that workmen's cars shall run between one and three o'clock for the benefit of workpeople.

Glass Fronts in Bendigo.—For the protection of the employees and the public from the weather the Bendigo East Political Labour League have asked the Tramways Company to have the ends of the cars fitted with glass fronts.

Tramway Traffic During Raids.—All the cars in Bradford are brought to a standstill when warning of a raid is received. It is reported that various ladies on a recent occasion provided tea for women conductors, who had to remain with the cars for hours in darkness.

Edinburgh Tramways.—In the event of the feared disagreement between the Tramways Company and Edinburgh Corporation on the subject of repairs to the tramways, arbitration is likely to be sought. Sir Alex. Kennedy is mentioned as the arbitrator who would be appointed. The report of the experts who were consulted by the Tramways Committee as to the future system of traction to be adopted was presented to the City Council on October 4. It recommends the overhead trolley system, which they state could be running six hours after midnight on June 30, 1919, without the city having received any facilities from the company. For Princes Street the experts advise that overhead wires should be installed on the south side, where they would be largely hidden by trees. If after experience of that the citizens decide against it, the overhead can be taken down and the conduit introduced.

Railway Shop Workers' Wages.—It was agreed on Thursday that all men employed in the railway workshops shall receive a war bonus of 5s. a week and all boys (under 18) similarly employed 2s. 6d. a week. The bonus, which is similar to that recently granted to the general body of railway workers, will be payable from September 16.

Long Distance Telegraphy and Telephony.—Professor J. A. Fleming will deliver a public lecture on this subject on Wednesday, October 18, at 5.30 p.m., at the University of London, University College, Gower Street, W.C., and on Fridays at 5 p.m., beginning on October 27, a course of six lectures on "Long Distance Telephony." Admission to the public lecture is free.

Profit Sharing.—The profit-sharing or bonus scheme introduced for the employees of Belfast Corporation Tramways by Mr. Andrew Nance, the late general manager, now the consulting engineer, is recalled by the publication of a scheme on similar lines by the Hackney borough electrical engineer for the employees and staff of the electricity undertaking. A plan of the same kind is in operation in one or two other municipal electricity undertakings.

Car By-Laws.—An officer belonging to Reading, and who had since gone to the front, was fined one guinea in each of two summonses for entering a Hull tramcar at the wrong end at a terminus and persisting in smoking a cigarette. For the defence a solicitor stated that defendant entered the car unwittingly, and he naturally resented being requested, after he had taken his seat, to leave the car, go round it, and enter it according to the by-laws. As for smoking, the defendant at once threw away his cigarette, and apologised.

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Steam Turbine Research.—The importance of complete research into methods by which the steam turbine can be improved in efficiency and reliability is impressed upon the National Research Committee in a resolution passed by the Newcastle Chamber of Commerce on Thursday. It was also suggested that the Government should be petitioned to consider whether pre-war contracts should not automatically end owing to the war.

New Leases of Swansea Tramways.—The Town Council have adopted a report presented by the Tramways Committee advising the granting of new leases to the Swansea Improvements and Tramways Company of (a) the tramways included in the tramway lease dated October 23, 1906; (b) the light railways and electrical equipment included in the light railway lease of October 23, 1906; and (c) the tramways recently constructed under the Swansea Corporation Act, 1912. The existing tramway and light railway leases are to be surrendered.

Organisation on the Great Eastern Railway.—Mr. H. W. Thornton, who three years ago came from the Long Island Railway to fill the post of general manager of the Great Eastern Railway, recently introduced some changes in organisation. In place of districts named after a town, the railway is apportioned into southern, northern, eastern, and western divisions. The management of passenger and goods traffic is now locally grouped under a commercial superintendent in each division. There are also divisional superintendents of operation, who deal with operating matters, including locomotive running.

Lost Property Regulations.—Salford Tramways Committee have adopted regulations for dealing with lost property. All property that is not immediately claimed will be handed over to the police, who will only return it to the owners on payment of reward to the finder at the following rates:—If the value is under 5*s*., 6*d*.; 5*s*. and under 10*s*., 9*d*.; 10*s*. and under 20*s*., 1*s*.; 20*s*. and not exceeding £5, 2*s*. 6*d*. in the £; £5 and not exceeding £10, 3*s*. in the £; over £10, by special arrangement. If the property is unclaimed and afterwards sold the finder will receive a percentage of the proceeds according to scale.

Tramways Collections for Patriotic Work.—In a recent fortnight the collecting boxes on the Glasgow cars realised £421 on behalf of Scottish prisoners of war in Germany. The money will enable 800 of such men to be supplied with specially prepared bread for eight weeks. Many thousands of briar pipes have been collected from Glasgow passengers and sent to the front after having been cleaned and repaired in the tramways workshops. From the weekly subscriptions of the employees the tramways department recently sent 5,000 pipes and 10,000 tins of tobacco to Glasgow troops in France.

Periodical Examination of Motormen.—On account of the present shortage of men the Leeds tramways department have had to modify the rule that no man can become a driver unless he has served as a conductor. The course of instruction has, however, been made more thorough in order to atone for the shortened period of tuition. Both before and since the war motormen have been examined once a year in order to see if they retain all the knowledge imparted. These tests include the steps to be taken in various emergencies, such as a car running backward on a gradient owing to a sudden failure of electrical energy.

Women Drivers.—Lowestoft Corporation have authorised the tramways manager to employ women as drivers where deemed necessary. The Tramways Committee had been informed of a report by the general manager of the Glasgow tramways stating that women drivers on the cars there are doing exactly the same work as the motormen. Mr. Dalrymple further stated: "We have, I think, on the whole, fewer accidents than we had with male drivers, and we are training all the likely women drivers who express a desire to be trained. The women are doing their work with remarkable confidence and adaptability."

Accidents to Pedestrians in the Darkness.—Owing to the restricted lighting now generally prevalent, reports continue to come to hand of pedestrians being killed and injured by various vehicles. Inquests were held on two persons at Sunderland whose deaths were caused by tramcars. One motorman stated that the only light shining was the reduced head light, which enabled him to see for about three or four yards. The town clerk informed the coroner that the tramways manager had issued a notice asking the public to use the utmost care on the roadways, and the committee were to consider the question of reducing the speed of the cars.

The Spirit of Bristol's Tramway Soldiers.—Mr. Charles Challenger, manager of Bristol Tramways and Carriage Company, is maintaining among the employees now serving in France the interest he has always taken in the welfare of the men under him. Evidence of this is shown in their letters published in the Bristol newspapers, the writers thanking him for the gift of newspapers and also the company for continuing the allowances to their families. One writer, who relates that "our division has come through the glorious great offensive with flying colours," says, "We shall do our best to show our appreciation when we are at peace again." Another observes that he hopes to be spared to "partly repay the company by faithful service."

Committee on the Summer Time Acts.—Greenwich time was reverted to on Sunday morning last. The Home Secretary has appointed a committee to inquire into the social and economic results of the Summer Time Act, and to consider (1) whether it is advisable that summer time should be reintroduced in 1917 and in subsequent years, and, if so, (2) whether any modification of the arrangements are required, and between what dates summer time should be made operative. The members of the Committee are the Right Hon. J. W. Wilson, M.P. (chairman), Mr. Malcolm Delivinge, C.B., Mr. Charles Duncan, M.P., the Right Hon. Laurence Hardy, M.P. (representing the Board of Agriculture), Sir John Lonsdale, M.P., Miss T. M. Morton, Sir Walter Nugent, M.P., Sir Andrew Pettigrew, and Mrs. Herbert Samuel.

Bonus for Good Work.—Mr. W. R. Spaven, general manager Portsmouth Corporation Tramways, in his fourteenth annual report states that the Tramways Committee decided on July 20, 1915, in consideration of the difficult conditions under which the men are working, to increase the bonus paid to motormen and conductors whose conduct has been satisfactory and free from blameable accidents from 10*s*. a man each half-year to 30*s*. a quarter; the women conductors to receive a bonus of 10*s*. each half-year for general good conduct and freedom from reports. The number who have received the bonus is very satisfactory. Mr. Spaven thanks the gentlemen who came forward to be trained as motormen, thus enabling the afternoon and evening services to be restored in March, 1916, to their original frequency. Further, the general manager expresses his great indebtedness to the permanent staff for their loyalty and co-operation towards achieving the satisfactory result of the past year's trading.

Sheep on Tramway Routes at Night.—An Aberdeen motorman was charged with driving "recklessly and carelessly" and running into a flock of sheep, killing five and injuring others. The mishap occurred at night, and the shepherd did not think the driver could have seen the sheep. He also admitted that it would have been better if he had carried a red light at the head of the flock. This was the motorman's first mishap during 17 years of service, and he gave evidence that it was impossible to see the sheep until close upon them. Mr. R. S. Pilcher, general manager of the tramways, said the motormen must be guided by lights now that the streets were so dark. Sheep or cattle should not be allowed on the streets at night during the present lighting arrangements. All the tramway authorities in the country considered that lights should be carried if flocks were driven at night. Owing to the restricted lighting some of the Aberdeen motormen were leaving. The magistrate found the accused not guilty.

PERSONAL.

Mr. James Swinburne, F.R.S., will deliver a lecture on "Science and Industry" at King's College, London, at 5.15 on Wednesday, November 1. Lord Moulton will preside.

Mr. J. M. McElroy, at the request of the Board of Trade, has been granted permission by Manchester Tramways Committee, to act as referee to determine the disagreement between Bacup and Rawtenstall Corporations as to fares and stages on the tramways.

Alderman J. H. Hargreaves has been selected as Lord Mayor of Hull for the fourth year. During the present year his lordship resigned the position of chairman of the Tramways Committee, which he had held for a number of years, his resignation being due to the increased work of the higher office occasioned by the war.

Sir Arthur du Cros, M.P., chairman of the Dunlop Tyre Company, is a member of the executive committee of the United Services Employment Council. This body has been formed to procure remunerative business employment for disabled, invalided, retired officers and gentlemen who have served in the ranks of His Majesty's Forces.

Mr. W. E. Riche, secretary of the Roads Improvement Association, has joined the Artists' O.T.C., and the Council of the Association have appointed Mr. J. D. Haworth, of the firm of Messrs. Tulloch and Haworth, consulting and civil engineers, 28, Victoria Street, as acting secretary during Mr. Riche's absence. Communications to the R.I.A. should be addressed to 15, Dartmouth Street, S.W.

Mr. T. Worthington, the director of the Commercial Intelligence Branch of the Board of Trade, retired on September 30. He was appointed to the position on the formation of the branch in 1899, and it has now a clerical staff of 150. Mr. Worthington recently arranged for the samples of German and Austrian goods collected since the war began to be loaned to Canada for exhibition in the Dominion.

Mr. Cyril W. Goodman, a son of Mr. W. G. T. Goodman, engineer and general manager of the Adelaide Municipal Tramway Trust, has been awarded the Angas engineering scholarship by the Council of Adelaide University. The scholarship is of the value of £200 per annum and is tenable for two years. Mr. C. W. Goodman was graduated from the University last year as a bachelor of engineering. As mentioned in a previous issue he has since enlisted for active service.

Mr. J. S. D. Moffet received a congratulatory vote from West Ham Council on the occasion of his departure to take up the duties of general manager of Belfast Corporation Tramways. The Corporation also approved of the Tramways Committee's suggestion that he should be presented with a testimonial on vellum under the Corporation seal, placing on record their appreciation of Mr. Moffet's successful management of the undertaking during his three years' service, and also the satisfactory manner in which the track repairs and the re-modelling and reconstruction of the cars had been carried out.

Mr. Andrew Nance was succeeded in the general managership at Belfast on October 2 by Mr. Moffet, but the Tramways Committee have retained his services as consultant. Mr. Nance became manager to the old tramways company in 1887, and in the course of a few years his administration had been so efficient and successful that the annual income was increased from £14,500 to £272,000. Mr. Nance continued to act as manager when the undertaking was taken over by the Corporation in 1904, electrified and extended. The local newspapers observe that in his retirement Mr. Nance carries with him the good wishes of hosts of friends, and it is hoped that he will be long spared to enjoy the rest to which his strenuous career has entitled him.

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Mr. F. Schofield, general manager, Leyton Urban Council Tramways has lately been a victim of a false statement that he is a German. Councillor F. M. Read, chairman of the Tramways Committee, writing to the local newspapers, says: "The sole basis of this wicked lie is that the manager's name is Schofield, which is as good an English name as any in the country. For hundreds of years Englishmen of the name of Schofield have lived in the North of England, particularly in Lancashire and Yorkshire. Mr. Schofield was born in the latter county, and resided there until he came to Leyton about eleven years ago. His two sons are serving in the British Army as commissioned officers. One went through the Gallipoli campaign, and is now in Egypt. The other was recently sent home from France to recover from the effects of German poison gas." Councillor Read adds that the cars are running strictly in accordance with regulations recently drawn by the Chief Commissioner of Police, and approved by the Field Marshal commanding the Home Forces. Further precautions have been taken to eliminate the risk of danger to the public.

CONTRACTS AND ORDERS.

Edgar Allen & Co. have an order to supply special track work for Manchester Corporation Tramways.

Yarmouth Tramways Committee have accepted the tender of a local firm for 40 oilskin overcoats at 16*s.* 6*d.* each.

C. A. Vandervell & Co., Ltd., of Worple Way, Acton, W., have received a contract to supply magnetos to the war department.

Lifting Jacks.—Manchester Tramways Committee have given an order for car lifting jacks to the Equipment and Engineering Company.

The Highways Committee of the London County Council have placed an order for the supply of car axle oil for the tramways department with Worringham & Co., Deptford.

Glasgow Tramways Committee have placed a contract with Pirelli, Ltd., for vulcanised indiarubber cable, and W. Miller & Co. for chilled iron brake blocks.

The Mirrlees Watson Co., Ltd., Glasgow, have recently received orders for 34 sets of condensing plant, practically all for war service work, and of varying steam duties up to 130,000 lbs. steam per hour.

Halifax Council have a contract with Arden Hill and Co., Birmingham, for the supply of an armature drying oven and a trolley for the car depot.

Barking Council have accepted the following tenders:—Siemens Bros., Dynamo Works, extra high tension cable, £1,013; General Electric Co., switchgear, £888; Brush Engineering Co., transformer, £611; Babcox & Wilcox, chain-grate stoker.

Johannesburg Council have allotted the following contracts:—Telegraph Manufacturing Company, five miles of trolley wire; Bruce Peebles & Co., Ltd., 2,000 kw. La Cour motor converter and spares.

Liverpool Corporation have adopted the recommendation of the Tramways Committee to purchase women conductors' overcoats from J. Hunter & Son, Ltd., Liverpool, and costumes from Coop and Co., Ltd., Liverpool.

Salford Council have accepted the following tenders:—I. Bentley and Co., Ltd., Manchester, supply and delivery of oil and paints required by the tramways department during the six months ending March 31, 1917; British Westinghouse Co., Ltd., blank cubicle with high tension switchgear and control panel for the rotary converter recently supplied by the company; J. Heaton, Ramsbottom, 2,500 tons of Tyldesley slack at 17*s.* 11*d.* per ton.

FINANCIAL REPORTS AND MEETINGS.

Depreciation Allowances at Burnley.—The following statement of the sums that should be annually set aside for depreciation of Burnley Corporation Tramways has been issued by Mr. H. Mozley, the general manager:—Rails, value £6,706, annual depreciation £2,787; paving, £43,770 £845; overhead, £15,549—£331; depôt buildings, rails, etc., £44,061—£185; general offices, £3,000—£13; centre offices, £5,160 £22; waiting rooms, etc., £407—£7; machinery, £2,800—£50; tower wagon, £642—£32; rolling stock, £54,947—£1,309. The total value is £257,213, and the total annual depreciation £5,672.

Birkenhead Corporation Tramways.—Mr. C. Clarke, general manager, in the fifteenth annual report presented to the members of the committee, states that in his last annual report, which included the first eight months of the war, he had to record a decrease in the receipts of £2,715 for the eight months, as compared with the pre-war period. He was glad to be able to report that the traffic had since so far improved that for the past year the income amounted to £72,820, or £4,212 higher than ever previously recorded. The total working expenses amounted to £38,833; sinking fund, income tax, etc., £23,417; balance £10,570, which had been allocated as follows:—In aid of rates £4,000, reserve fund £2,000, renewals fund £4,570. The reserve fund now stands at £3,040 and the renewals fund at £27,307. The price of current had been raised from .953*d.* to 1.053*d.* The total revenue per car mile averaged 14.84*d.* and working expenses 7.01*d.* War allowances to dependents of employees on active service amounted to £1,580, and war bonus to £884. Up to date 67 employees had volunteered for active service, and five had been killed. The female employees had carried out the work of cleaners and conductors satisfactorily to the public and the department. At the present time 63 females were employed. The collections on the cars for the various war charities amounted after 34 weeks to £2,093.

Portsmouth Corporation Tramways.—The importance of the tramways in the great naval centre is indicated by the great increases in the number of passengers carried during the past two years, although during each period the shortage of staff led to reductions in the car mileage, especially in the past year. While in 1915-16 there were nearly two million more passengers, the mileage decreased by 267,843 miles. The improved financial result shown in the appended tabular statement was achieved in spite of the concession in May, 1915, of issuing books of 16 tickets for a shilling and eight for sixpence, and the lengthening of the fare sections. The books give a reduction of 25 per cent. on the ordinary fares.

Year ended March 31,	1916	1915	1914
Capital expenditure	£733,181	£731,174	£772,684
Amount outstanding ..	£366,624	£423,103	£449,206
Traffic revenue	£126,324	£121,909	£115,168
Total revenue	£127,546	£123,991	£116,991
Working expenses	£59,301	£56,888	£57,620
War allowances	£2,778	£1,770	—
Gross balance	£65,467	£65,333	£59,371
Net profit	£23,278	£22,568	£18,702
Passengers carried	29,338,918	27,554,194	26,266,342
Fare per passenger	1.033d.	1.061d.	1.052d.
Car mileage	2,170,778	2,438,621	2,506,058
Units per car mile	1.238	1.139	1.103
Power cost per car mile ..	.760d.	.549d.	.576d.
Traffic receipts per track mile	£3,650	£3,535	£3,325
Traffic receipts per car mile	13.96d.	11.998d.	11.030d.
Expenses per car mile ..	6.556d.	5.590d.	5.518d.
Ratio of working expenses ..	46.49	45.88	49.25
Total track mileage	34 m. 48 c.	34 m. 48 c.	34 m. 51 c.
Number of cars in stock ..	100	100	100

GOODRICH TYRES.

"Commercial Vehicles of Great Britain" is the title of an 84-page illustrated publication issued by the B. F. Goodrich Company, Ltd., 117-123, Golden Lane, London, E.C. The petrol, electric and steam vehicles of 48 makers are dealt with, each machine and its specification occupying a separate page. On account of the war the firm have found it impossible to quote prices in this issue, but they hope to do so in a future volume. The present publication will, however, prove of great value to users and intending users, for it enables them to institute a profitable comparison of the various types in order to decide which make of vehicle is likely to serve them best, and in which direction to look for further particulars. To broaden the basis of its appeal, and to bring it into closer harmony with its comprehensive purpose, the work includes the following articles, etc., dealing with the various aspects of band tire service:—(1) Weights of materials commonly hauled by commercial vehicles; (2) fundamental questions involved in changing from horse to motor delivery; (3) relation of tire equipment to cost of maintenance of commercial vehicles; (4) devices that make for commercial vehicle efficiency; (5) British standard rim diameters for solid tires for automobiles. There is also a list of Goodrich tire depôts in Great Britain and Ireland.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-four of the principal tramway undertakings in the United Kingdom for the week ended September 23 give total receipts of £182,845, or £10,404 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or sixty-nine more than for the corresponding week. The receipts this year were at the rate of £81 10*s.* 10*d* per mile of single track, and last year at the rate of £79 15*s.* 1*d.*, thus showing an increase for the week of £2 4*s.* 9*d.* per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

Shepherd's Parging Blocks.—The accidental insertion of a word in a note published in our issue of September 14 with reference to Shepherd parging blocks may possibly have given rise to some misapprehension. The object of the block parging is of course to prevent the bedding being squeezed out from under the paving and up into the cavities of the rail. That it does this with advantage to the maintenance of the track is well known to many of our readers by very satisfactory experience.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Last.	Name.	Paid.	Price, July 27, 1914	Cash. Oct. 5.	A Week Ago.
5%	5%	Alabama Traction. 5% 1st. Mt.	—	67	68½	68½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅝	70/-	70/1½
4%	4%	Do. 4% Deb. ...	100	91	74	74
4½%	4½%	Do. 4½% Deb. ...	100	98½	77	76½
5%	5%	Do. 5% Deb. ...	100	96	74½	74½
1/-	7d	Auckland Elec. Trams. Ord. ...	1	1⅝	21/-	21/-
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	94	94
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅛	10⅜	10⅜
4½%	4½%	Do. 4½% Deb....	100	96	83	83
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	91½	91½
$¼	$1	Brazilian Trac. & Power Ord. ...	$100	66	57½	59½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	93½	92xd
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	7	7⅜
2/6	2/6	Do. 5% Cum. Pref.	5	5	85/-	85/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	59	60½
6%	5%	Do. Pref. Ord....	100	106	61½	61½
5%	5%	Do. 5% Cum. Pref.	100	103	73	75
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	89	89
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	68⅞	68xd
—	£3	Brit. Elec. Trac. Ord.	100	—	36½	36
	6%*	Do. 6% Cum. Part Pref. ...	100	—	80½	79½
5%	5%	Do. 5% Deb.	100	92	83xd	86½
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	70½	70½
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	81½	81½
3/-	6/6	Calcutta Tramways, Ord. ...	5	7½	133/-	68½
1/3	1/3	City of B.A. Trams.	5	5½	90/7½	90/-
5/-	4/-	Dublin United Trys 6% Pref.	10	12	11½	11½
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	27/6	27/6
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅜	2/1½	2/1½
6/-	6/6	Lanarkshire Trys. Co.	10	10½	9⅝	9⅝
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9½d.	9½d.	Llandudno & Colwyn B. Ord. ...	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	1½	2/4½	2/4½
6d.	6d.	Do. 5% Pref.	1	1/6	7/9	8/-
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	62	62½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	89	88½
5%	5%	Do. 5% Inc. Deb.	100	88½	82	84
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	47½	47½
3/-	3/-	Madras Elec. 6% Pref. ...	5	5⅛	96/6xd	96/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	66½	66½
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	67½	67½xd
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	78	78
$1½	$1½	Mexico Trams. Common ...	$100	70	31½	31½
5%	5%	Do. 1 Mt. 5% G.B.	—	8¼	43½	44½
6%	6%	Do. 6% Mt. Bds.	100	76	35½	35½
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	94½	94½
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95½	95½
1/2*	1/2½*	National Steam Car	1	½	29/3	19/10½
9½d.*	9½d.*	New General Traction	1	⅞	7/9½	7/9½
6d.	8½d.	Northern Gen. Trans. Ord. ...	1	8½	15/4½xd	15/4½
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	70/-	70/-
5%	5%	Do. 5% 1st Deb.	100	80½	74½	74
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80½	80½
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	⅛	11/-	11/3
10d.	8d.	Provincial Trams. Ord.	1	⅞	17/-	17/-
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84½xd	84
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	92	92
5%	5%	1st. Mt. 5% 50 yr.	100	89½	78xd	82
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	92½	92½
5%	5%	Do. 5% Perp. Deb.	100	99½	81½	81½
—	—	Singapore Elec. Trams	5/-	¼	4/10½	4/10½
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	96½	96½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	82½	82½
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	95	95
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	77xd	79
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	9/3	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	90/-	90/-
—	—	Metropolitan Dist. Ord. ...	100	21½	17	18
—	—	Undgd. Elec. Rys. of London ...	10	2½	36/3	37/9
		Do. "A"	1/-	⅜	5/6	6/-
4½	4½	Do. 4½% Bds of 1933 Rd.	—	99	100½	101
6	6	Do. 6% 1st Cum. In. Db.	100	114	106½	106½
6	6	Do. 6% In. Bonds Rd. ...	—	88	88½	89½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1915	Latest Return. 1916	Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	Sept. 30	£49,939	£50,947	40	£1,977,833 —	£2,992
Auckland.....(28 days)	Aug. 25	19,876	20,469	8	41,974 —	55
Ballarat and Bendigo ...	Aug. 13	2,860	2,791	20	15,870 +	836
Brazilian Traction Mlrs.	Aug.	6,576 000	7,184,000	35	54,329,000 +	3,365,890
Brisbane	Aug.	35,064	37,900	35	265,130 +	20,416
British Columbia.....$	Aug.	507,126	550,293	9	1,088,586 +	70,737
Buenos Aires Lacroze ...	Sept. 3	39,355	37,075	13	111,945 +	10,338
Burmah Tramway ... Rs.	Aug.	25,159	24,412	4	24,412 —	747
Calcutta.....Rs.	Sept. 30	63,824	74,297	40	2,651,972 +	130,618
Cape Town	Aug.	...	13,394	...	...	...
Carthagena & Herrerias..	Sept.	1,252	1,779	39	22,600 +	7,020
Cordoba	Aug.	14,159	13,852	22	71,165 +	469
East India	Sept.	2,054	2,523	9	5,045 +	725
Hong Kong .....$	Sept. 2	11,656	17,048	38	508,853 +	125,754
Kalgoorlie	July	2,775	2,521	31	17,458 —	1,496
La Plata	Sept.	3,894	3,994	39	37,622 —	257
Lima	Aug.	32,004	33,395	25	270,710 +	12,959
Lisbon .....Escu.	Aug.	...	203,703	...	...	...
Madras .....(2 weeks)	Sept. 30	28,304	31,788	39	569,786 +	41,725
Manila	July	23,750	32,700	31	887,739 +	39,986
Manaos .....Rs.	July	...	152,380	...	...	...
Melbourne	May	...	69,275	...	...	...
Montevideo	Sept.	25,070	26,711	48	319,043 +	15,626
Pernambuco	Oct. 1	2,945	3,094	39½	47,568 —	2,034
Peruvian .....$	Aug.	819,039	895,900	9	1,731,330 +	187,453
Port Elizabeth	Aug.	...	2,863	...	...	...
Rangoon	Sept.	4,445	4,137	39	41,328 —	2,001
Shanghai .....$	Sept. 16	26,064	29,952	...	...	...
Singapore .....$	Aug. 26	11,989	12,352	34	425,407 +	45,287
Toronto.....$	Aug.	762,627	889,241	35	7,092,229 +	746,526
Winnipeg	Aug.	251,189	249,795	35	2,193,957 —	57,510

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Name.	Week ended	Latest Return. 1915	Latest Return. 1916	Incr. or Dec.	Wks.	Aggregate. 1916	Incr. or Dec.
Aberdare U.D.C.	Sept. 26	£356	£431	+ 75	26	£10,201	+ £1,150
Aberdeen Corporation...	,, 27	1,767	2,025	+ 258	17	33,957	+ 1,737
Accrington Corp.....	,, 27	584	670	+ 86	26	15,524	+ 557
Ayr Corporation	,, 30	363	438	+ 75	20	10,711	+ 889
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.....	Oct. 1	1,366	1,671	+ 305	26½	40,981	+ 3,796
Birmingham Corp.	Sept. 30	15,213	18,118	+ 2,905	26	434,288	+ 65,977
Do. Motor Omnibuses	,, 30	829	1,078	+ 249	26	26,338	+ 3,279
Blackburn Corp.	,, 27	1,245	1,385	+ 140	26½	35,106	— 1,097
Blackpool & Fleetwood.	,, 23	1,304	1,268	— 36	38	36,452	+ 3,038
Blackpool Corp.	*	...	...	...	...	...	...
Bolton Corporation.....	Oct. 1	2,545	3,539	+ 994	27	78,490	+ 5,425
Bournemouth Corp.....	,, 4	1,981	2,337	+ 356	27	66,870	+ 4,553
Bradford Corporation ...	Sept. 30	6,393	7,077	+ 684	26	184,572	+ 6,300
Brighton Corporation ...Oct.	1	1,101	1,421	+ 320	26½	36,402	+ 3,595
Bristol	Sept. 29	9,702	10,997	+ 1,295	39	394,218	+ 18,419
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	,, 30	1,592	1,766	+ 174	27	46,953	+ 2,499
Burton-on-Trent Corp...	Oct.. 1	286	294	+ 8	26	7,311	— 585
Bury Corporation.....	,, 1	1,329	1,726	+ 397	27½	39,548	+ 1,813
Cardiff Corporation.....	Sept. 23	2,804	3,039	+ 235	25	77,142	+ 6,251
Chatham & District.....	,, 28	1,241	1,381	+ 140	39	48,145	+ 2,064
Chesterfield Corp.	,, 23	276	274	— 2	25	7,201	+ 245
Colne Corporation	,, 30	246	278	+ 32	...	...	...
Cork Electric	,, 28	503	542	+ 39	39	19,985	+ 196
Croydon Corporation ...	*	...	...	...	...	...	...
Derby Corporation	,, 30	1,014	1,163	+ 149	26½	30,508	+ 1,941
Dover Corporation	*	...	...	...	...	...	...
Dublin & Lucan	,, 29	165	189	+ 24	13	2,463	+ 202
Dublin United	,, 29	6,265	6,682	+ 417	39	236,179	— 2,443
Dundee City	,, 20	1,370	1,386	+ 16	18½	26,240	+ 726
East Ham Corporation ...	,, 30	1,299	1,392	+ 93	26½	35,240	+ 95
Exeter Corporation.....	,, 29	367	445	+ 78	26	10,895	+ 285
Glasgow Corporation	,, 30	23,054	24,543	+ 1,489	17½	409,132	+ 28,781
Glasgow Subway.....	,, 30	1,096	1,123	+ 27	39	44,399	+ 3,933
Glossop (U. Elec. Supp.)	,, 30	128	162	+ 34	40	5,561	+ 552
Halifax Corporation.....	,, 26	2,287	2,341	+ 54	25½	60,943	+ 894
Do. Motor Omnibuses	,, 26	50	52	— 2	25½	1,306	— 59
Hastings & District.....	Oct. 2	1,032	1,267	+ 235	39	42,315	+ 2,715
Huddersfield Corp.	Sept. 30	2,822	3,117	+ 295	26	79,163	+ 6,693
Hull Corporation	,, 30	3,067	2,979	— 88	26	82,209	+ 1,219
Ilford U.D.C.	,, 26	634	695	+ 61	24	17,179	+ 850
Ilkeston Corporation ...	,, 20	147	143	— 4	25	3,579	+ 164
Ipswich Corporation	,, 30	542	557	+ 15	26	14,664	— 680
Isle of Thanet	,, 30	372	436	+ 64	52	19,776	— 3,088
Kilmarnock Corp.	,, 30	163	181	+ 18	19½	3,545	+ 26
Lanarkshire	,, 28	2,426	2,658	+ 232	39	90,277	+ 13,526
Lancashire United	,, 27	1,788	2,170	+ 382	39	71,246	+ 2,873
Leeds City.....	,, 30	8,998	10,310	+ 1,312	27	263,975	+ 24,211
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	,, 30	786	909	+ 123	19½	17,898	+ 2,137
Leyton U.D.C.....	,, 28	1,606	1,889	+ 283	26	45,217	+ 900
Liverpool Corporation...	,, 30	13,492	15,080	+ 1,588	39½	551,743	+ 27,547
Llandudno & Colwyn B.	,, 29	352	461	+ 109	43½	16,575	+ 989
London County Council	*	...	...	...	...	...	...
London Genl. Omnibus	*	...	...	...	...	...	...
London United.....	*	...	...	...	...	...	...
Lowestoft Corporation...	*	...	...	...	...	...	...
Maidstone Corporation..	,, 21	251	243	— 8	25	5,679	— 157
Manchester Corp.....	,, 30	17,606	19,765	+ 2,159	26	501,172	+ 27,100
Met. Elec. Trys.	*	...	...	...	...	...	...
National Steam Car.....	*	...	...	...	...	...	...
Nelson Corporation	,, 30	201	237	+ 36	26½	5,801	+ 462
N'castle-on-Tyne Corp.	,, 30	6,542	7,117	+ 575	26	175,175	+ 5,955
Newport (Mon.) Corp....	,, 30	831	1,014	+ 183	26	25,279	+ 2,447
New St. Helens & Dist.	,, 27	1,037	1,111	+ 74	13	15,466	+ 323
Northampton Corp.....	,, 29	707	732	+ 25	26	18,787	— 1,385
Nottingham Corp.....	,, 28	3,682	4,592	+ 910	26	103,384	+ 3,707
Oldham Corporation ...	Oct. 1	2,109	2,408	+ 329	27	69,331	+ 4,266
Portsmouth Corp.....	Sept. 16	2,840	3,377	+ 529	...	...	...
Preston Corporation.....	,, 27	962	1,156	+ 194	26½	28,779	+ 3,263
Provincial	,, 30	2,172	2,591	+ 419	52	121 476	+ 7,416
Reading Corporation.....	,, 28	781	924	+ 143	25½	22,596	+ 1,370
Rhondda Tramways.....	,, 27	1,263	1,410	+ 147	38	48,572	+ 4,068
Rochdale Corporation...	,, 30	1,619	1 885	+ 266	26½	48,948	+ 1,920
Rotherham Corp.....	Oct. 4	1,170	1,625	+ 446	26½	41,687	+ 10,395
Salford Corporation.....	,, 2	5,104	5,800	+ 696	25½	148,543	+ 7,870
Sheffield Corporation....	,, 1	9.130	11,505	+ 2,375	29½	287.142	+ 45,549
Southampton Corp.....	Sept. 27	1,547	1,721	+ 174	25½	43,984	+ 3,630
Southend-on-Sea Corp...	,, 27	809	954	+ 145	26	27,684	+ 3,022
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.....	,, 30	791	871	+ 80	26½	22,499	+ 971
Sunderland Corp.....	Oct. 1	1,470	1,603	+ 133	26	43,899	+ 3,135
Sunderland District...	Sept. 27	595	698	+ 103	47	29,453	+ 2,090
Swindon Corporation ...	,, 27	209	220	+ 11	25½	5,419	+ 105
Torquay Tramways.....	,, 21	721	815	+ 94	38	23,328	+ 1,618
Tyneside Trys. & Tmrds.	,, 20	594	654	+ 60	12	8,649	+ 615
Wallasey Corporation ...	,, 30	1,187	1,434	+ 247	26½	38.447	+ 2,170
Walsall Corporation.....	,, 30	775	869	+ 94	40	32,273	+ 3,124
Walthamstow U.D.C...	,, 30	823	1,323	+ 500	26	30,381	+ 4,721
Warrington Corp.....	,, 28	466	535	+ 69	26	12,887	+ 1,014
West Ham Corporation	,, 28	3,081	3,666	+ 585	25½	85,636	+ 2,930
Wigan Corporation	,, 28	1,548	1,776	+ 228	26	43,980	+ 3,680
Yorkshire (W Riding)...	Oct. 1	1,579	1,915	+ 336	40	70,515	+ 6,765

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RAILWAY ELECTRIFICATION.

Tramway & Railway World Descriptions.

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ELECTRIFICATION OF THE CHICAGO, MILWAUKEE AND ST. PAUL RAILWAY.

(*Issue of September* 14, 1916.)

This is an account of a high-tension direct-current installation of unprecedented magnitude. The railway extends westward across the American prairies, then over the Rocky Mountains and on to the Pacific Coast. The section now electrified stretches for a distance of 440 miles over three successive mountain ranges, and its construction includes some notable features. The article presents a general description of the arrangements for power supply, the overhead construction, and the electric passenger and goods locomotives. Characteristic curves of both types of locomotives are given. Maps, numerous photographic illustrations and drawings serve to convey a realistic idea of the magnitude of the work.

LANCASHIRE & YORKSHIRE ELECTRIFICATION.

MANCHESTER-BURY SECTION—DIRECT CURRENT SYSTEM AT 1,200 VOLTS.

(*January* 13, 1916.)

A detailed description of the equipment of the Manchester-Bury section, the latest enterprise of the Lancashire and Yorkshire Railway in the electrification of their lines. The first section electrified was the Liverpool-Southport line, which was equipped in 1903-4 by Dick, Kerr and Co., Ltd., on the 500 volt direct current system. In the present instance current at 1,200 volts is sent out on the conductor rails, and the train motors are designed for working at this pressure. The description is accompanied by over 50 clear drawings and photographs.

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EQUIPMENT OF LONDON SUBURBAN LINES.

(*November* 13, 1915.)

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Causes of rail corrosion—Exposure to sea water—Effect of corrosive liquid.

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Effect of vehicular traffic—Cause of loose rails—Importance of quality in sets—Square-dressed setts—Nidged granite setts—Bonawe granite setts—Wood paving—Bedding of setts—Laying and ramming.

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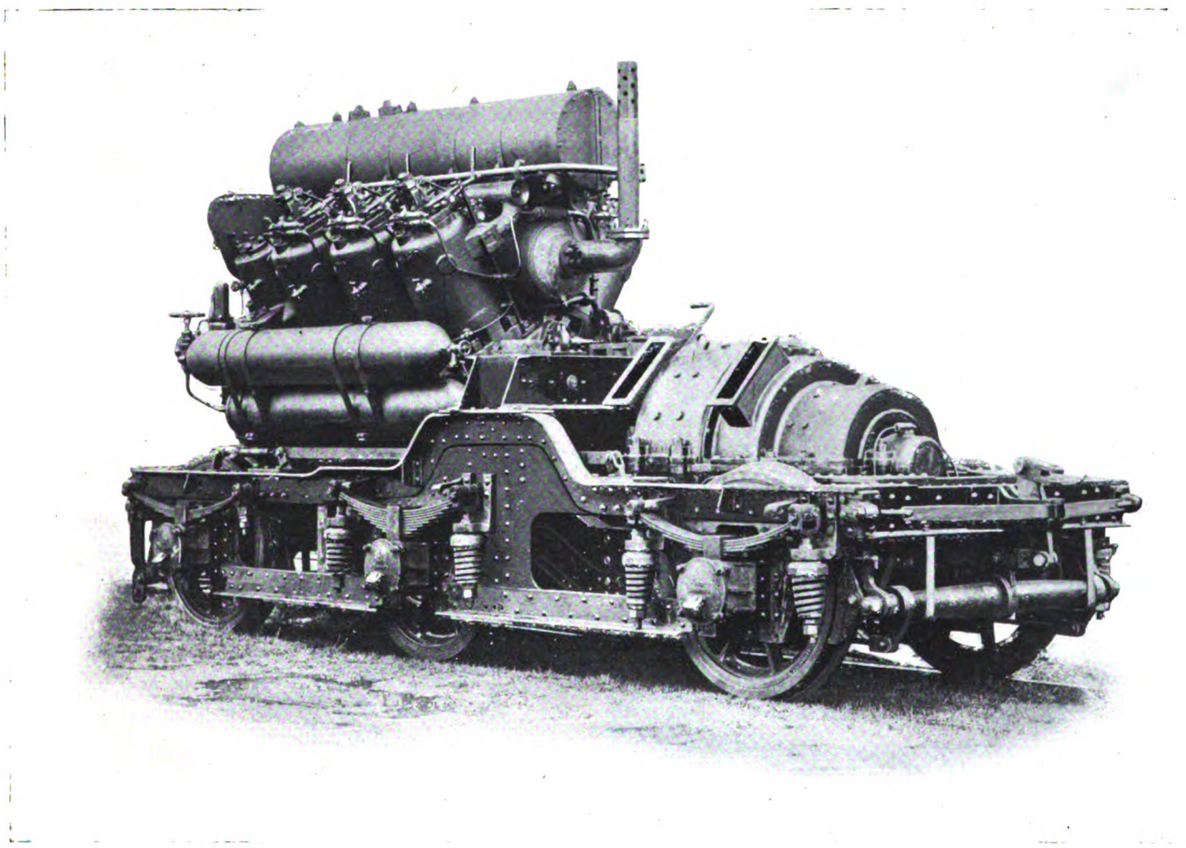
THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

Founded 1892. LONDON, OCTOBER 12, 1916. VOL. XL.

A DIESEL-ELECTRIC COMBINATION FOR RAIL MOTOR CARS.

Favourable results have already been obtained with the petrol-electric system applied to railway service. Cars equipped on this system have been at work for some time on railways in this country, France, Egypt, and elsewhere. A new and important step has lately been taken by Continental manufacturers in the design and construction of Diesel-electric rail motor cars, that is, of cars whose axles are provided with electric motors that are worked by current from an electric generator driven by a direct-coupled heavy-oil internal combustion motor.



Truck with Diesel Motor, Electric Generator.

Two rail motor cars of this type were ordered before the war from the Brown Boveri Company by the management of the Saxon Railways, and the electrical part of the work on these was carried out by them, the mechanical apparatus (including the Diesel engines) being entrusted to the firm of Sulzer Brothers, of Winterthur.

On completion the cars were tested at first over the section of line between Rastatt and Gernsbach, and were afterwards put into regular work between Leipsic and Dresden, a distance of 80 miles. The final tests which were carried out on June 8, 1915, were continued from 8.30 a.m. until 4 p.m. with intermediate stops; the speeds obtained ranged up to 44 miles per hour on long stretches; and the tests generally gave such good results that the cars were at once put into regular service on the Leipsic-Dresden section. The fuel consumption per kilometre at a speed of 70-75 kilometres per hour is said to be 0·6 kilogram, so that as the oil tank carries about 400 kilograms of fuel, the car is able to travel for 650 kilometres or 400 miles without requiring fresh supplies of fuel.

Judging from these results, it seemed reasonable to anticipate for this method of traction a useful future, and in view of the special importance that it has for lines that must be equipped and worked with the minimum of cost, the constructive details of these cars merit the attention of railway managers and engineers, particularly in view of the pressing need for economy that will be felt after the war.

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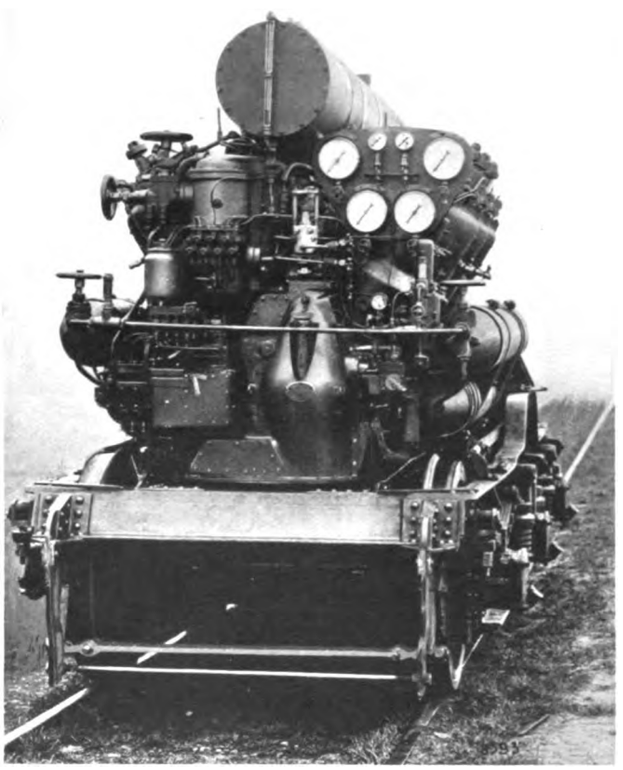
Each rail motor car has two trucks—the leading one with three axles, the rear truck with two. On the former is mounted a Diesel engine of special design direct-coupled to a continuous-current generator with exciter mounted on the same axle. The current from this generator at voltages varying between 200 and 380 volts is led to the traction motors mounted on the axles of the rear truck, in a manner already well known and used in the case of petrol motors, but with the great advantage of much lower cost of fuel, as well as increased safety in working, by reason of the use of Diesel oil with a much lower flash point.

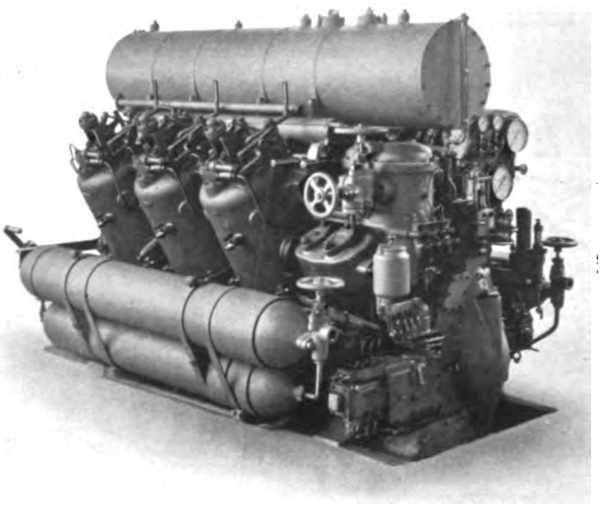
The weight of each of these cars, which are of standard gauge, is approximately 65 tons, and as already stated, they can work up to a speed of 44 miles per hour. The passenger compartments are all third class and can carry up to 100 persons, 80 seated and 20 standing. The overall length is approximately 72 ft. The Sulzer-Diesel engine, complete with flywheel, fuel, oil, and compressed air tanks, &c., weighs about 9 tons only.

On the trailing truck are mounted the two continuous-current traction motors which are provided with a single magnet frame with two armatures. They are rigidly mounted on the truck, powerful leaf springs being fitted between the axles and truck framing. Connection from the motor axles to those of the truck is made by an intermediate geared axle and side rods to the truck wheels. The two motors can develop a joint output of 360 H.P. for a short period of overload, and 160 H.P. in continual service.



View of Truck showing Diesel Motor.

Protection is given to the Sulzer-Diesel engine and electric generator, carried on the forward truck on three axles (as in the case of ordinary motor cars), by means of a hinged sheet metal cover, which allows, however, of easy and rapid inspection. The engine is of the four-cycle Sulzer type with six cylinders, each 260 mm. diameter with stroke of 300 mm., set diagonally at an angle of 30 deg. with the perpendicular in order to reduce to a minimum the space occupied. Its output is 200 H.P. effective at 450 revolutions, but it can for a short period cope with an overload of 250 H.P. The crank axle is set parallel with the axis of the car



Diesel Motor Ready for Mounting on Truck.

and to the right and left under the cylinders are fixed reservoirs for compressed air. These furnish the supply for starting the engine and feeding in the fuel, and are kept filled by a compressor driven directly from the engine crank axle. The air used for starting is compressed to between 50 and 75 atmospheres.

The cylinders are cooled by water, which circulates through an air cooler after passing round the cylinder heads. On lines where car heating is desired, the cooling water can be led through radiators under the car seats, thus serving a double purpose.

The crank axle is coupled directly to the electric generator axle by means of a special elastic coupling designed by Messrs. Brown Boveri and Company with a view to eliminating the difficulty of vibration due to the irregular running of the engine. The same object is also aimed at by a special pneumatic regulation (applied from the driver's platform at either end of the car) of the fuel oil valves. This device—designed by Messrs. Sulzer—allows the engine revolutions to be reduced to 200 per minute when the car is at rest, thus giving considerable economy. The electric generator is designed for an output in steady working of 140 KW., but will run up to 190 KW. for one hour without excessive rise in temperature. The machine is entirely closed with the exception of two ventilation openings, through which cold air is drawn in through the windings and thereafter expelled.

The traction motors are started and regulated as to speed in a very economical fashion by a modification of the Leonard system. By varying resistances in the exciter armature circuit, the voltage of the generator is controlled and thereby the traction motors also.

A driver's cab is provided at each end of the rail car vehicle itself, so that it may be driven in either direction without requiring to be reversed. The cabs are, of course, fitted with all necessary apparatus for control and manœuvre, as well as electric measuring instruments for the generator and circuits generally. The exciter is coupled direct to the generator shaft, and has an output of 7·5 KW. at an E.M.F. of 70 volts. It serves not only to excite the generator field coils,

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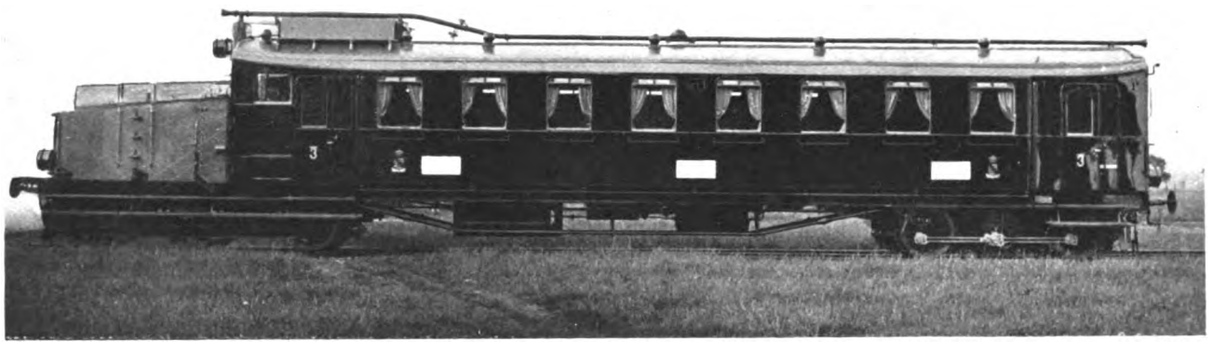
but also to drive the fan that cools the water for the engine cylinder jackets. Moreover, when the Diesel engine is running light, it can by means of the exciter be made to charge a battery of accumulators mounted under the body of the car. This battery has a capacity of 90 ampere-hours on a three-hour discharge, and serves both for lighting the vehicle and for operating train whistles or other signals. It is furthermore connected up to the field coils of the exciter, and therefore on starting up the engine the generator field can be at once fully excited.

Also worthy of note is a safety arrangement comprising an auxiliary block circuit which opens or closes the exciter main switch to generator fields, according as the said circuit itself is open or closed. This circuit is opened or shut by means of a contact connected with the controller handle, and the same action also takes place if the safety brake comes into play through a heavy overload on the two motors. Interruption of the auxiliary circuit also interrupts the exciter current, and therefore stops further supply to the traction motors. Besides this, the auxiliary circuit brings into action the compressed air brake in a few seconds after the current is interrupted.

The results obtained with this rail motor car both from tests and from actual working service have been so favourable that the makers have at present under construction three more rail motor cars and one locomotive, all employing the same type of arrangement, and they are also working out designs for locomotives and for rail motor cars both larger and smaller than those now described, to standard and to narrow gauge also. The rail motor cars are designed generally for powers of from 100 to 300 H.P.; beyond this capacity, it is preferred to employ locomotives carrying one or more Diesel engines which may develop up to as much as 2,000 H.P. This fact serves to show the great interest being taken in this new arrangement, which certainly would seem destined to have a very considerable development.



Diesel Electric Rail Motor Car.

Gas Fuel for Generating Stations.—The Electricity Committee of Brighton have reported an offer by the British Coalite Company, Limited, to supply gas as fuel for the boilers. Some expenditure would be necessary in order to adapt the boilers, etc., but the committee estimate that half of the present cost of fuel would be saved. The company propose to erect a retort and plant for carbonising coal on land adjoining the generating station at Southwick Basin, whither coal is brought by sea. Similar plant is now being installed at Barugh, near Barnsley, and the Yorkshire Electric Power Company have agreed to take and use residual gas as fuel.

TRAILER CARS IN LONDON.

OVER ONE HUNDRED IN USE.

Perhaps the best indication of the value of trailer cars to London is to be found in the fact that in October last the Board of Trade agreed to their being run during the period of the war at all times of the day on the authorised routes. Previously the trailers were only used at periods of rush traffic. It is safe to predict that after the experience now being gained there will be no return to the restrictions, which were no doubt a concession to the senseless obstruction that the police all along unsuccessfully offered before Parliamentary Committees. More than a hundred and thirty trailers are now in service on four routes south of the Thames, these districts having the heaviest traffic in the metropolis. In the course of a few weeks the full number of 150 trailers that were ordered from the builders will be in operation. We understand that special facilities were granted for the rapid delivery of the vehicles that has been witnessed during the past ten months, for the authorities were quick to discern the value of the trailers, both for the speedy and safe conveyance of passengers and for enabling motor men and conductors to be liberated for service in the war.

The Board of Trade have also granted authority to the Metropolitan Electric Tramways Company to use trailers in the districts served by their lines outside the northern boundary of the county of London. To these outer suburbs there is a heavy traffic, notably from such places as Cricklewood and Finsbury Park. When the war is over an extension of trailer traffic in the form of through running is likely to be seen from the Victoria Embankment *via* Tooting to Hampton Court and other places in the Thames valley. With the support of the County Council the London United Tramways Company obtained powers for that purpose before the war broke out. On the County Council's lines there has not been a suggestion that the trailers offer any obstruction to other traffic. Three of the services—Tooting, Norbury, and New Cross—pass through the busy junction known as the Elephant and Castle, and it is impossible to stand there and watch the traffic without observing that a motor car and trailer pass over it in less time than would be taken up by two motor cars. An observer will also note that the staircases of the trailers are so placed that if the necessity arises the cars can be operated on the front exit system.

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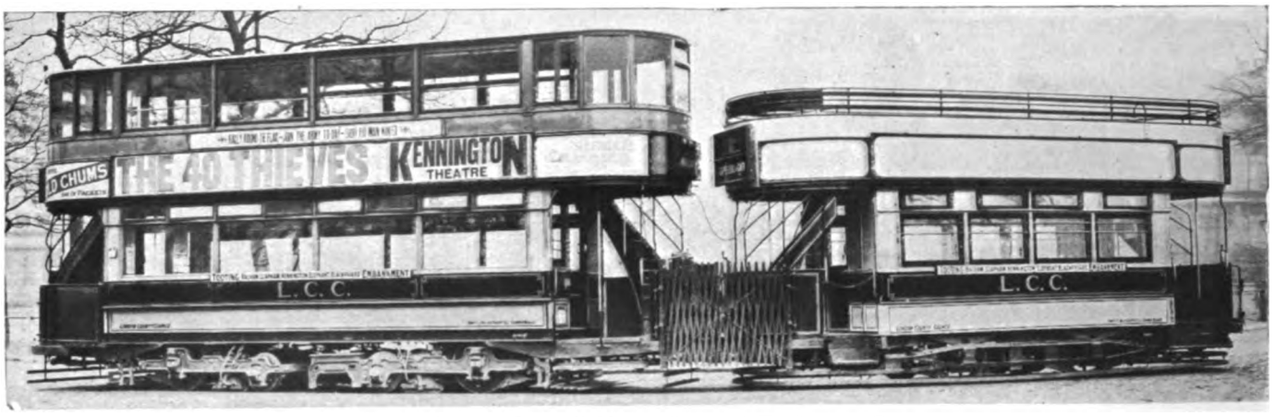
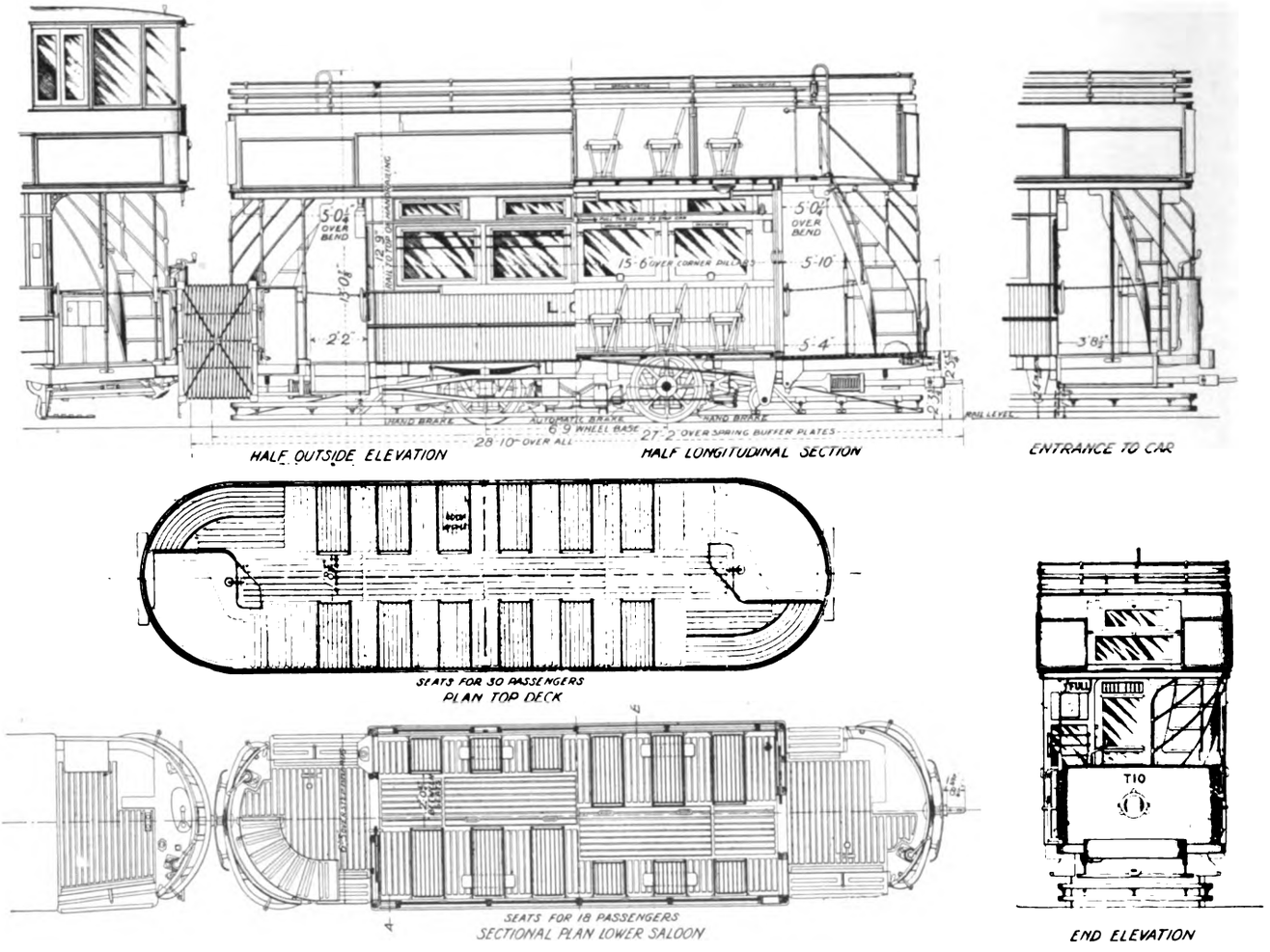
A brief reference to the shunting of the trailers will be of interest. Two methods are adopted. When the terminus is level the trailer is left at the entrance to a crossing, over which a motor car will come from the adjoining line and pull the trailer back with it. coupled to a later car in readiness for going through the same movement. The only matter for regret is that the cars cannot run through to Croydon owing to the disinclination of the Corporation to render their track capable of taking the extra traffic.



London County Council Motor Car and Trailer on Curve.

At the London and Croydon termini the metals of the former are on a slight gradient until a few yards before the Croydon boundary is reached. The system adopted here is for an incoming car to drop its own trailer and to couple up with one standing in front, pushing it

Delegates to the conference of the Municipal Tramways Association had the opportunity to gain first-hand knowledge of trailer working. Local considerations must guide provincial tramway authorities in the matter of adopting trailers, but there is every



Plans and Elevations of London County Council Trailer Car.

over the crossing to the end of the line, the woman conductor on the trailer holding off the automatic brake by applying a lever on the platform. When loaded up the two vehicles proceed together. Meanwhile the trailer dropped by this motor car has been

prospect that when the war terminates trailer traffic on electric tramways in this country will be given a great impetus by the courageous stand made in its behalf by Mr. A. L. C. Fell, of the London County Council Tramways, and its successful operation by his staff.

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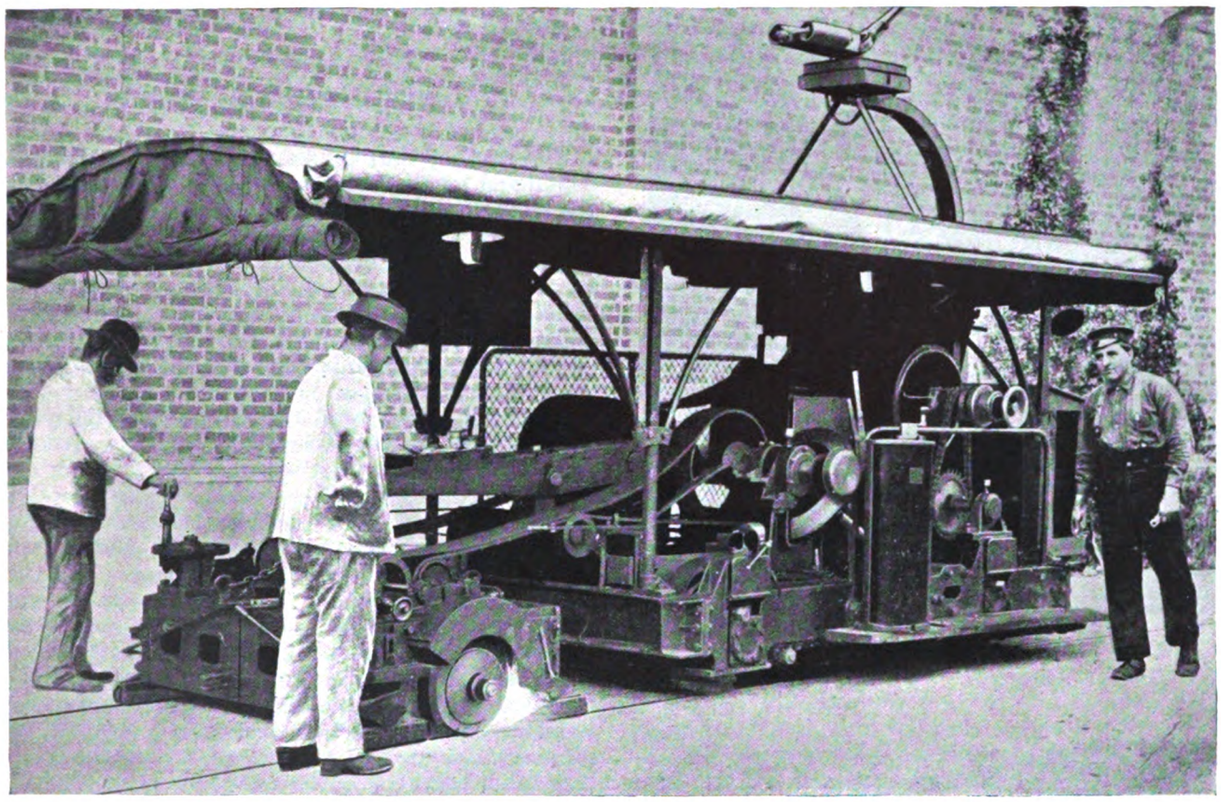
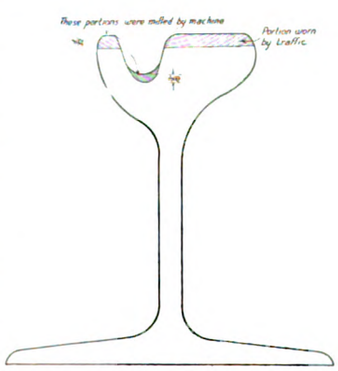
THE WOODS-GILBERT RAIL PLANER AND GRINDER.

At the conclusion of the recent conference of the Municipal Tramways Association, a number of the members and delegates paid a visit to Bexley Heath and inspected the Woods-Gilbert rail planing and grinding machine, which is there at work grinding corrugations out of the tramway rails. A few days later a number of metropolitan tramway managers also paid a visit of inspection. In their earlier years the Bexley tramways were free from corrugation, but more recently the trouble has been very extensive, scarcely a length of rail being free from crrugation. The work of the machine at Bexley has so far been confined to the grinding out of corrugations, but it will be used later to remodel stretches of worn-out rails which have been in use ever since the tramways were opened in 1903.



Woods-Gilbert Machine Grinding Tread of Rail.

In our issue of Oct. 16, 1913, there appeared a general description of this ingenious and then novel machine, but some details about it are now available. The invention, which is in the hands of the Woods-Gilbert Rail Planer Company, Limited, originated in Australia, and the machine was used in Melbourne and other Australian towns before it appeared in this country. The company enter into contracts with tramway authorities for remodelling worn rails, so that the rail life may be increased by as much as 50 per cent. The remodelling comprises the deepening of the groove, the cutting down of the guard lip, and the removal of the dish at joints and of corrugations.



Remodelled Rail Section.

The main machine or tractor is a powerfully-built vehicle which carries all the operating gear and a powerful electric motor. As will be seen from the illustration, an overhead canopy carries a trolley pole and wheel for collecting current from the overhead wire. To the tractor is coupled either a grinding or a milling attachment, according to the kind of work to be done. The grinding attachment is shown in the foreground of the illustration. The grinder for removing corrugations and dishing at joints has two 24 in. abrasive wheels, so that both rails are worked upon simultaneously. This attachment runs on four sets of rollers. Each grinding wheel has a separate vertical feed. For deepening the groove of rails and cutting down the lip the milling attachment is used. The work is done by 12 in. rotary high-speed cutters. The machines are accurately balanced so as to ensure a fine adjustment to the work. As to the grinding, it is claimed that to get satisfactory results a powerful machine, such as the Woods-Gilbert, with ample weight and rigidity, is necessary. The latest type of the machine weighs from 9 to 10 tons. Regarding capacity, the machine when grinding treats approximately 12,000 ft. of single track per month, and when milling it disposes of 9,000 ft. of single track in the same period. The machine has been designed with suitable under-gearing to enable it to be run along the tracks at speeds up to 20 miles an hour, when not engaged in milling or grinding. In this way it can be rapidly run to the nearest cross-over and be sent over to the other track to allow a night car to pass on tramways where night cars are run. If the line is single track, or if there is no convenient cross-over, then by the use of transverse gearing the machine can be quickly removed from the track to allow the car to pass. The work on the rails

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Rail Before Treatment.

Rail After Treatment by Woods-Gilbert Machine.

is, of course, carried out by night. The operating staff consists of a mechanical engineer in charge and two assistants.

Several tramway systems in this country have had their worn rails remodelled with most satisfactory results. The last place was Wigan, where four miles of track have been dealt with so satisfactorily that a further contract has been entered into. Before the work was done the rails were so badly worn that the wheel flanges were in contact with the bottom of the groove. The latter has been deepened to three-quarters of an inch, and the cost has not exceeded £530 per mile.

INDIAN RAILWAY POLICY.

The inquiry into Indian railway management as conducted by the State and by the companies respectively is of general interest throughout the Empire. It is of particular interest to the managers and contractors of railway and tramway undertakings, because all stores and materials of every description have to be ordered by and supplied through a Government department in State-owned undertakings, while private companies are not hidebound by rules, regulations, and codes.

From the paper read recently in his eighty-eighth year by Sir Guilford Moleworth, with the above title, much instruction was anticipated; as a matter of fact it will greatly rejoice all so-called "congress-wallahs" (including Mrs. Annie Besant) and those whose objects are to discredit the present rule in India, and to promote Parliamentary government by Indians. This would mean, in fact, Home Rule; but India is the last quarter of the globe where such a principle is applicable, or can possibly lead for many years to come to anything but dire disaster. The lecturer's opinion will unfortunately carry great weight with all the disaffected, as he has been a Government official for a great number of years, having been attached to headquarters as consulting engineer to the Government of Ceylon and of India. In this position he has been responsible, in a great measure, for the Government policy in regard to railways, and yet he now repeats antiquated opinions enunciated by him thirty years ago. He affirms that "the enormous profit of the railway companies is a national misfortune; for not only does such profit quit the country, but every rupee thus gained militates against our (the Indian) export trade." One answer to this is, of course, that the capital raised in this country and spent on the railways in India is more than recouped every twelve months by the material gains of the country as a whole. As regards the "enormous profits" of the railway companies, these can only be shown by misreading the statistical returns. This having been done to a remarkable extent, no doubt quite unconsciously, by Sir Guilford, the bottom drops out of his assertions as to all the other misdeeds of the companies and of the "speculators" whose enterprise enabled the railways to be started. The profits of the year 1912-13 to the Indian railway companies are stated to have amounted to £15,617,000, "an enormous and ever-increasing amount." As a matter of fact, after paying all charges on loans, on annuities, on sinking fund, and after paying *less* than half a million sterling to the companies as their share, the profit to the State was no less than £4,789,533, all of which went into the general revenues of India. The lecturer guarded himself by thus prefacing his conclusions: he said, "If I am correct in this inference." Unfortunately he was incorrect, and his erroneous conclusions have got such a start that we fear they will never be overtaken by the truth.

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TRAMWAY PASSENGERS AND THEIR FARES.

By a Barrister-at-Law.

Judging from the reports of tramway managers and others, tramway authorities at the present juncture are suffering from some loss of revenue by passengers omitting to pay their fares before alighting from the cars. When a passenger is detected, he relies upon the fact that his fare has not been demanded of him. The shortage of male employees and the darkened nights have led to an increase of this class of offence by diminishing opportunities for detection. Under these circumstances it is desirable to review the law on the subject, to see what powers tramway authorities have and to suggest what remedies might be employed.

All tramway authorities are bound by the terms of the Tramways Act of 1870, subject in every case to the provisions of their special Acts. Section 46 of the Tramway Act empowers the local authority of a district in which a tramway is laid down to make regulations and by-laws for enforcing regulations. It also authorises the promoters of any tramway and their lessees to make regulations for regulating the travelling in or upon any carriage belonging to them, and by-laws to enforce the regulations. It also imposes a penalty for a breach of any by-law, providing that the maximum penalty that can be inflicted shall not exceed forty shillings and ten shillings for any continuing offence. Section 51 specifically states that "*if any person travelling or having travelled in any carriage on any tramway avoids or attempts to avoid payment of his fare*, or if any person having paid his fare for a certain distance knowingly and wilfully proceeds in any such carriage beyond such distance and does not pay the additional fare for the additional distance, or attempts to avoid payment thereof, or if any person knowingly or wilfully refuses or neglects on arriving at the point to which he has paid his fare to quit such carriage, every such person for every such offence shall be liable to a penalty not exceeding forty shillings."

In addition to their statutory powers, tramway authorities possess their common law rights. "They have a right of property in their cars and have the right to protect them from trespass by a person remaining therein or thereon without paying or intending to pay his fare, and in order to protect their property they may eject such a person from their car. A person by merely mounting a tramcar does not escape the common law liability to be treated as a trespasser if in fact he is one. It is true that there are other remedies given by the Tramways Act, 1870, and their by-laws, but those are not exclusive remedies, and therefore, I think," said Mr. Justice Lawrence, in the case of Whittaker *v.* London County Council (1915), 2 K.B., pp. 680, 681, "that the question left open by Kennedy, L.J. in Hutchins *v.* London County Council, must be answered by saying that a trespasser, such as I have referred to, can be lawfully ejected from a tramcar."

The regulations and by-laws made by a tramway authority or company may or may not, according as they are framed, deprive the authority or company of the advantage which is conferred upon them by Section 51; for instance, a regulation with a by-law enforcing it, which required a passenger to pay his fare on demand might make the demand a condition precedent to the enforcement of any penalty against a person who after travelling left the car without paying his fare. An examination of the language used in Section 51 suggests that an offence is committed apart from any by-law by a person who "travelling or having travelled avoids or attempts to avoid payment of his fare." The words "knowingly or wilfully" are omitted, and this is somewhat remarkable if either proof of the knowledge or wilfulness of the passenger is an element in the offence required to be proved against him, because later on these words are introduced in the parts of Section 51 which deal with "travelling beyond the distance paid for without paying for an additional ticket, or journeying beyond the destination." It may reasonably be supposed that the legislature considered that a passenger who had travelled by a car must be aware of the fact whether he had paid his fare or not by purposely omitting the words "knowingly or wilfully" in the one case and using them in the other. A passenger, moreover, may be unwittingly carried beyond the destination for which he has paid his fare, but having paid one fare, the presumption would be that in travelling beyond his destination he had no intention to defraud, but had done so in ignorance or unconsciously. The burden of proof would then properly rest upon the tramway authority to show that he had travelled beyond his destination either "wilfully or knowingly." If he had either "wilfully or knowingly" travelled beyond his destination his *bona-fides* would not avail him.

In Tuffley *v.* Tate, decided in 1907 (96 L.T., 24), a case under the Light Railway Act, a passenger, accompanied by his nephew, took two tickets, requesting the conductor to stop at the Queen's Hotel, a place where the cars stopped on request. The conductor forgot to stop and the passenger was carried two hundred or two hundred and fifty yards beyond his destination. The passenger refused to leave the car, and stated that he intended remaining in it to lodge a complaint. He refused to pay additional fares or to give his name and address. He was summoned under a by-law which provided that each passenger shall upon demand pay to the conductor or other duly authorised officer of the company the fare legally demandable for the journey. It was decided that the by-law was good, and the passenger could be convicted although there was no intention to defraud.

In Hunt *v.* Green, 1907 (96 L.T., 23), a by-law was held good which provided that "each passenger shall show a ticket if and when required to do so to the conductor or any duly authorised servant of the company, and shall also when required to do so either deliver up his ticket or pay the fare legally demandable for the distance travelled by such passenger." A passenger paid his fare and received a ticket. In the course of his journey he lost it. On being asked to produce his ticket by an inspector he was unable to do so, although the conductor admitted that he had paid for and received one. The passenger was requested to produce his ticket, pay his fare, or leave the car. He declined to comply with any of these requests. He was held liable for an infringement of the by-law, which was held to be a reasonable one.

With reference to this case, it may be said that by framing a by-law in the way that it had been framed, the company had deprived itself of the power that it would have undoubtedly possessed of taking proceedings under Section 51 of the Act.

One practical difficulty in obtaining payment is the existence of short-distance fares. When a car is fairly full both inside and out, it not infrequently happens that a passenger enters and wishes to alight whilst the conductor is busily engaged collecting fares on the top of the car. What is the passenger then to do? To leave the fare with another passenger inside, or deposit it somewhere on the car, or wait until the conductor descends the stairs? The adoption of the last alternative may mean that the passenger is carried half a mile beyond his destination. No wonder that a good many persons alight without paying their

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fares at all. Is a practical solution of this difficulty impossible? This is a question for tramway managers. The law on the subject, apart from special by-laws, is clear enough, although many of the travelling public seem to be completely ignorant of it. A notice prominently displayed both inside and on the top of the car, calling attention to the words of Section 51, would probably assist the companies by enlightening passengers as to their responsibilities and their inability to escape them by reason of the conductor's failure to demand their fares.

LONDON TRAMWAY FINANCE.

By A. J. Lawson.

It has now become usual to expect adverse results from the working of the London County Council tramways, and to see the deficits made up annually from the general reserve. That reserve may possibly tide the undertaking over another year before a tramway deficiency rate will have to be levied upon the ratepayers generally in consequence of the inability of the Council to get paying results from the working of what should be one of the finest tramway undertakings in the world.

It is amusing, however, to learn that in the opinion of the leader of the Progressive party "It pays to carry people cheaply. The figures both of London and of Glasgow prove the financial soundness of the halfpenny fare." The answer to that absurd statement is to be found in the figures given in the accounts of both cities which were published in The Tramway and Railway World of July 22, and I propose analysing these for the purpose of making the facts understandable by those who might be misled by Sir John Benn's sophistries. He boasts of carrying 62,000,000 workmen passengers a year in the early morning hours, before motor omnibuses leave their garages, but conceals the fact that this service is rendered at an annual loss to the undertaking of £80,000. I am aware that he and some other members of the Council claim that these passengers at very reduced fares pay for the actual operating expenses of the service, but do not contribute anything to capital charges. The argument is fallacious. It might as well be claimed that a jobmaster, for instance, was making a profit who sent out a man with a pair of horses and a four-wheeled vehicle to carry, say, a dozen people eight miles to their work every morning, six days in each week, if their fares were sufficient to pay the driver's wages for the period of his absence and covered the cost of the horses' feed the previous evening, though nothing were earned on the return journey.

With the present number of passengers carried at workmen's fares an increase of 2d. per person per week would wipe out the deficit on this service, and 3d. per passenger per week, or ½d. per day, would give a slight profit on these early morning services.

The perpetuation and extension of halfpenny fares was, however, the Council's greatest blunder, having regard to the huge capital expenditure on the London tramways. To plead the example of Glasgow as a justification for halfpenny fares in London is to ignore facts. Glasgow's tramways pass through nearly every business street, and the traffic in the central parts in both directions is almost as dense at mid-day hours as at morn or night. London's traffic, on the contrary, overcrowds main cars and trailers in one direction only twice a day, while during mid-day hours the traffic is very light and the trailers are taken off, as well as many of the electric cars, and even the reduced number remaining in service throughout the day carry but few passengers. The difference is clearly shown by the number of passengers per car-mile. Glasgow's smaller cars, without trailers, carry 14·5 passengers per car-mile; London's huge cars, with a large and ever-increasing number of trailers in use, carry only 11.4 passengers per car-mile run. What the result would be in point of revenue if the London cars could obtain the same number of passengers as the Glasgow ones, even on the present car-mileage, is shown further on.

Dealing now only with the abolition of halfpenny fares and making the minimum fare 1d., as has been done in West Ham, Leyton, and Walthamstow, in which places an improvement, though slight at first, is already discernible in the weekly returns, it may at once be conceded that a considerable number of people who at present ride very short distances on a halfpenny fare would walk sooner than pay 1d. *on a fine day*. Assuming that even half of them did so there would be no loss in receipts, the amount received from the remaining half, being at twice the rate, would balance the loss from the abstention of the other half, of whom more and more would return to riding in all weathers. Even allowing a permanent loss in numbers of 33⅓ per cent.—an excessive allowance—the gross revenue from the higher fare would increase from £337,500 as at present to £450,000—a net gain of £112,500. It is, however, probable that the total number of passengers would not eventually fall below the present figures, in which case the addition to the present revenue from passenger traffic would be equal to the whole amount now received from halfpenny fares, or in other words, £337,500 a year. Adding to this the £80,000 a year now lost on workmen's fares which, as already stated, would be made up by 2d. more per week from each of the 200,000 people who daily patronise these early cars, we should have in that case the very substantial addition of £417,500 annually to the present inadequate revenue. That sum would be thus raised to a gross total of £2,756,770, from which would have to be first deducted the working expenses of £1,683,660 (taking last year's figures) and leave a balance of £1,073,110. Out of this balance the interest and sinking fund charges require £752,385, leaving only £320,725 for depreciation and permanent way renewals. If we take Glasgow as the model to be followed (and it is a good one), £255,375 of this amount would be placed in the depreciation fund, leaving only £65,350 for permanent way renewals, while Glasgow's example of making sufficient provision for this very necessary work requires in London a contribution to that fund of not less than £166,000. Therefore we would still be about £100,000 short of the amount necessary to make the same proportionate provision for depreciation and renewals as Glasgow now does (to say nothing of the £43,458 she places to the common good) even after revising fares, and obtaining additional passengers to replace those who will walk sooner than pay 1d. for the privilege of riding. If the London tramways could obtain as many passengers per car-mile as Glasgow does, the needed revenue would be more than made up, for the number of people to be carried would be, 694,255,000 on the same car-mileage of 47,879,675 as at present and consequently at not much greater cost in working. With such a total and an average fare of 1d. the finances of the London County Council tramways would be placed on nearly as sound a footing as those of Glasgow, but not quite. Unfortunately it is quite impossible for the London County Council tramways as at present laid or run to carry any such number of people, or to hope for any such financial return. The improvements at termini and extensions of lines already suggested in the columns of The Tramway and Railway World would have to be undertaken before such favourable results became possible.

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In the meantime the revision of fares above suggested is vital and urgent if in future Parliament is to be asked to grant fresh powers for new lines or other improvements, since it is not likely such powers would be granted to a Council whose management of an undertaking under existing powers has not only failed to make the enterprise pay its way but may have involved the inhabitants generally in making good its losses out of the rates. And it is useless waiting, or delaying the matter till after the war. The conditions then will be more difficult than now, more especially if the various funds be in the meantime wholly depleted, and track and cars be not properly maintained, to say nothing of the growing obsolescence of the generating plant in the power house at Greenwich, and the distributing plant in the various sub-stations.

To bolster up the contention that all is well with the London County Council tramways we are asked to compare the results with those of Glasgow. For the sake of facilitating the comparison as much as possible I append in parallel columns the principal figures from the accounts for last year, and a short analytical summary of percentages in each case. Here they are :—

	London.	Glasgow.
Route miles worked	144½	99
Track miles worked	289	198
Capital expenditure	£13,516,577	£3,835,156
Capital repaid	£3,935,586	£1,475,337
Capital outstanding	£9,580,991	£2,359,819
Capital per mile of route	£93,540	£38,740
Capital per mile of track	£46,770	£19,370
Receipts from passengers	£2,278,659	£1,149,264
Gross revenue	£2,339,291	£1,157,337
Working expenses	£1,683,660	£693,005
Balance remaining	£655,631	£464,332
Interest and sinking fund	£752,385	£200,088
Depreciation fund	*Nil*	£105,725
Permanent way renewal fund	*Nil*	£68,681
Income-tax	£40,000	£39,854
War allowances	£95,365	£80,438
Profit after paying all charges	*Nil*	£43,458
	£73,795 deficit	
Car-miles run	47,879,675	24,963,309
Passengers carried	545,423,397	362,371,464
Traffic receipts per route mile	£15,690	£11,571
Traffic receipts per car-mile	11·36d.	11·05d.
Passengers per car-mile	11·39	14·51
Average fare per passenger	1·003d.	·761d.
Operating costs per car-mile exclusive of war allowances	7·961d.	6·658d.
Operating costs per car-mile including war allowances	8·439d.	7·467d.

To the above working expenses there is required for interest and sinking fund payments only (exclusive of any provision for depreciation or permanent way renewals) a further amount per car-mile in London of 3·771d. but of only 1·924d. in Glasgow, thus further accentuating the essential differences between the two places, as for every £100 of capital expended on the London tramway system Glasgow spent only £29 15s. There is the difference in length of lines, however, to be taken into account. Including this consideration the relative capital outlays are :—London £100, Glasgow £41 8s., or as percentages, London 100 per cent., Glasgow 41·4 per cent. The other ratios are :—

	London. per cent.	Glasgow. per cent.
Capital repaid	29	38·5
Capital outstanding	71	61·5
Ratio of expenses to revenue, including war allowances	72	60
Ditto, excluding war allowances	68	53
Gross revenue to total capital	17·4	30·2
Net revenue to total capital	4·85	12·1
Interest and sinking fund charges to total capital	*5·57	5·2
Contribution to depreciation	*Nil*	2·76
Contribution to permanent way renewals	*Nil*	1·79
Contribution to "public good"	*Nil*	1·13

* Exceeding net revenue, hence draft on general reserve of £73,795.

With such results staring from the balance sheets of the two undertakings it requires a good deal of courage to state, as some County Councillors do, that all is well with London tramway finance and that were it not for road maintenance and rates (which, by the way, every tramway in the kingdom has to pay) there would be a handsome profit. A handsome profit on working at a loss !

Let anyone work out for himself from the data here given the problem : What should be the average fare on London tramcars, with a total of only 50 per cent. more passengers than in Glasgow, to obtain the same return upon capital ? The answer will surprise him, and convince him it cannot be done with the present halfpenny fares.

That it could be done if the present halfpenny fare stages were greatly reduced in length is a suggestion that has been made by some of those who contend that the halfpenny fare, properly apportioned, would be a valuable source of revenue. Experiment in this direction might very well be undertaken by the Council. After all, the London transport problem is *sui generis*, and only the most painstaking and constant experimental study of it will enable the best solution to be found. Its importance justifies all the investigation that can be given to it.

CAUSES OF RAIL CORRUGATION.

Mr. Mason D. Pratt, chief engineer of the United Railways and Electric Company, of Baltimore, has contributed to the *Engineering Record* the appended statement of the causes of tramway rail corrugation, based on twenty-five years' experience in the manufacture of rails and the construction and maintenance of track :—

(1) Self-propelled Cars.—Practically all corrugation occurs on electric tramways where all or a large majority of the cars are self-propelled.

(2) Girder or other rails having considerable vertical stiffness.

(3) Soft Steel for Rails.—The extent and depth of corrugation is in inverse ratio to the content of carbon and other hardening elements.

(4) One Type of Car in Operation, particularly double-truck, four-motor equipment.—On tracks over which there is regularly operated a service of mixed types of cars, corrugation may appear from time to time, but unless some other feature (as, for instance, No. 3) is the cause, the corrugation will usually "iron out."

(5) Contour of Rail Head.—Flat-headed rails, or those on which the wheels have only a narrow or partial bearing, will develop corrugations earlier than those on which the wheels have a full bearing (as on convex-head rails).

(6) Heavy mill scale on the rails. On rails that have been rolled under conditions producing heavy mill scale that is allowed to go through the finishing pass, the surface of the rails has been so heavily marked as to start corrugation immediately after the rails have been put in service.

Other causes are (7) rapid acceleration and deceleration ; (8) unequal diameter of wheels on same axle ; (9) long radius curves ; (10) intensity of wheel loads ; (11) track foundation ; (12) segregation of steel ; (13) track sanding ; (14) grades.

Mr. Pratt has inserted the following clauses in his specifications for rails for the last two years, and this is reported to have had a beneficial effect :—

"In the rolling process such precaution shall be taken as may be necessary to entirely remove mill scale just prior to rails entering last two finishing passes, and otherwise to produce a finished bar having smooth, regular, and true surface on head and in finishing contact areas.

"Any rails showing by the closest possible inspection the slightest indication of corrugation will be rejected."

Mr. Pratt submitted the foregoing statement to the chief engineers of the larger tramway systems in the United States, and he states that while their individual experience varied somewhat the conclusions were substantially agreed to.

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LONDON, OCTOBER 12, 1916.

Tramways and the War. The presidential address of Mr. Peter Fisher at the conference of the Municipal Tramways Association afforded a most interesting and comprehensive summarised review of what has been done by tramway organisations in relation to the war. The address, if read by one who had not closely followed events in the tramway field during the past year, would come as a revelation. The annual report of the Executive Council, on its part, shows how numerous have been the matters arising out of war conditions which have been successfully dealt with. In the broader aspect, as Mr. Fisher pointed out, the main service of the tramways has been in the way of aiding the supply of munitions and keeping industry alive. In these directions no more essential service can be imagined than the providing of facilities for taking munition workers to and from their labours. In spite of depleted staffs, the tramways have responded and are responding magnificently. Hence the appropriateness of the Government having recognised the provision of tramway facilities as munitions work. The patriotism and bravery of tramway employees are well emphasised by the statistics which Mr. Fisher submitted in regard to the men who have joined the Forces and the women who have come in to take their places. The President's remarks on the subject of increasing tramway fares in order to meet higher costs are worthy of close attention. That more revenue is needed, especially for repairs and renewals after the war, is indisputable. A great deal of necessary expenditure is being postponed till then, and the longer it is postponed the heavier will be the demand. As to the problems arising after the war, the President was confident that they will be satisfactorily settled. One of the most important things to be dealt with, both for the tramways and the industries of the country, is the development of the carriage of goods on the tramways. That was also treated in a separate paper submitted to the conference, and it will receive continued attention until such traffic has been developed on a proper system.

Future Requirements. One of the most valuable aspects of the work of the Municipal Tramways Association is that while providing efficient machinery for dealing with emergencies, such as have occurred during the past two years of war, the annual conference serves to direct attention to problems of the future. In addition, the delegates are able to create through the municipal governing authorities a body of opinion that can make its influence felt among the members of the Legislature. Food for reflection along each of those lines of thought is provided by Mr. McElroy's notes on passenger transportation in large cities, and by the remarks of every speaker in the exceedingly fruitful discussion. There are moderate-sized as well as great towns that will benefit from paying immediate attention to the warning voiced by Mr. McElroy. From his active study of traffic conditions in Europe and America, in order to devise means of relieving the saturation of the main arteries in Manchester, Mr. McElroy has good grounds for warning other towns that they may be involved in similar difficulties sooner than their rulers think may be the case. Confirmation of this was strikingly afforded by the observations of Mr. J. B. Hamilton. No public transport authority can afford to neglect the moral conveyed in the Leeds manager's assertion that nobody would have looked for such a development of tramway traffic as has

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occurred during the past decade. Equally important is it that heed should be paid to two further principles laid down by these two managers. Mr. McElroy urged abstention from voting tramway earnings to the relief of the rates, and that the money should be put aside in order to provide means to relieve congestion arising from increased traffic. Further, he advised profiting from the fact that the world's experience has shown the necessity of every city being provided with a permanent authority directing the initiation and carrying out of all schemes for new transit facilities, in order to secure continuity of policy and to provide for the needs of a wide surrounding area, as well as the city immediately concerned. From the remarks of the deputy chairman of Coventry Tramways Committee, it is evident that the need for such an authority is felt there. Other places could also be named as examples to bear out our contention that in provincial centres, as well as in London, there is need for the formation of a Traffic Board. It may be that the beginnings of such an authority are now being hammered out in the joint committee, representative of several departments of the Corporation, who are engaged in considering the needs of Manchester. That Mr. Hamilton's views tend in the same direction is evident from his suggestion that in order to prevent the depletion of tramways committees' coffers by other departments a joint committee should be formed of all the bodies interested in street traffic. Birmingham, which has its central traffic problem as a legacy of past inaction, is awake to the importance of joint action in the town planning of its outer districts. Sooner or later many towns will have to follow suit if they are not to suffer for neglect of the old adage that a stitch in time saves nine. One encouraging outcome of Mr. McElroy's paper was the revelation that London has one unofficial citizen who has rendered himself a capable student of traffic problems by means of travel and study. Mr. H. H. Gordon's remarks showed that in the great questions remaining for settlement in the metropolis he can rise above partisanship. Like the author of the paper, he advocates unified control for all the instruments of traffic.

Goods Traffic.

Considering the searching manner in which the paper of Messrs. Holford and Clough dealt with the question of utilising tramways for goods carriage, it was surprising that so effective and instructive a discussion followed. The authors and speakers were all managers who have had experience of carrying goods and mineral traffic, if only in one or two cases for the requirements of their own undertakings, and no speaker ventured to question the possibility of goods transit where sidings can be constructed into warehouses and works. Therefore the subject is one that calls for extended investigation on the lines so well marked out by the authors of the paper, and no time should be lost in appointing for that purpose a joint committee of the two tramway and light railway associations. Mr. McElroy's remarks failed to take count of the main reason that has led to the revival of the discussion, a cause that is contributing to the tramway congestion problem with which he is faced in Manchester. For a long time prior to the war, manufacturers in Manchester and the intervening towns complained of the difficulty of obtaining raw material, etc., from Liverpool docks, and of sending out their goods. That trouble has been accentuated by the war. Thus there would appear to be fair scope for instituting a new means of service by and in connection with tramways. That possibility has long been in the minds of the tramway managers whose systems are linked up in the district, and, as Messrs. Holford and Clough observed, the tramways of Yorkshire could be arranged to afford similar facilities. There is no reason why this aspect of the question, and also that of local working, pure and simple, where feasible, should not be forwarded by the managers concerned, independent of deliberations on the broad general question. The policy of the body charged with the latter work might include consideration of legislative matters, and the giving of a lead to the Board of Trade to facilitate the granting of further powers that may be deemed necessary, especially in the light of the economic competition that must follow the war. The old policy of Government departments simply holding the scales fair for rival interests must be terminated. If this country is not to be handicapped, the guidance

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must come from the men who at every hour of the day are in touch with the wants of the community. The way to assist in enforcing a new order of things is for every tramway manager to consider whether the examples of Leeds, Huddersfield, and Burnley can be followed in their towns. Mr. Hamilton is not resting content with what he has already accomplished, for his annual report indicates that he is giving attention to the possibility of providing goods and mineral facilities for districts far removed from railway termini. Besides greatly enhancing the usefulness of the tramways, a scheme of that character will rid the streets of many slow-going units that not only create congestion, but add to the cost of track and road maintenance.

Air Raids and Lights on Vehicles.

Recent events have served to revive that rather vexed question as to whether traffic should continue to run during air raids. There are some extremists who advocate total stoppage on the approach of aircraft being definitely known, and certain incidents that occurred on the morning of Sunday, September 24, might, at first thought, tend to support this view. Much has been made of damage either on or near certain main roads, and flashes from tramways or electric railways have come in for a good deal of comment. The cold truth of the matter is that these flashes, whilst very vivid as seen from the ground, or near, are too spasmodic and brief to afford any reliable guidance from above, and the real source of danger is believed to be, not these brilliant flashes, but the continuity of relatively dim lights carried by vehicles such as any busy highway will provide. There being, therefore, no reason for discontinuing tramway or electric railway traffic *as such*, it only remains to consider the question of whether traffic should, on these occasions, be stopped or not as a whole. It is difficult to see what can be gained by such a measure. So far as the safety of the vehicles and their drivers or passengers are concerned, they are no better off in standing still than in motion, and in other respects time is being lost and delay incurred. Stoppage of traffic, moreover, in the absence of general warning signals, which the authorities have largely abandoned, can only be effected by holding up at centres, which means a concentration of vehicles and people at comparatively few points. This is obviously undesirable, and on reflection there seems to be no difficulty in arriving at the conclusion that, so far as the safety of the traffic and those concerned in its movement is involved, the best plan is to keep it in motion and as widely distributed as possible. From the standpoint of the safety of the community in general, it has already been observed that anything like continuous lines, even of very dim lights, is more likely to help the enemy than "arcing," inasmuch as it is relatively constant, and lends itself far more easily, therefore, to observation and reckoning. To that extent, then, life and property about a busy highway is in rather more peril than is the case elsewhere. Taking into consideration, however, the hours at which raids commonly occur, and the inconsiderable density of traffic in all but a few special areas at that time, the extra degree of danger is exceedingly small. It certainly is not anything like so great as to call for a total stoppage of all traffic. Nevertheless, some precaution is demanded, and the most obvious and the most simple is that of total extinction of all vehicle front lights, screening of rear lights so as to be visible only directly ahead, with drastic reduction of speed on signals, which could easily be given by exhibiting, for instance, coloured lamps at traffic centres. Such signals would cause no general alarm, and pedestrians happening to be abroad at the time would be apprised in two ways of the advisability of getting home or looking out for shelter. They would either observe the signals at important points, or, failing that, the running of traffic with lights out would be sufficient intimation. A scheme of this kind has, in fact, been adopted in part, and on the whole it seems to be a common-sense way of meeting the present emergencies. To run traffic without lights at night is not a desirable expedient, but its dangers are so obvious as to a large extent to neutralise themselves. The need for extremity of caution in such conditions would assert itself so forcibly as to compel both drivers and pedestrians to play for safety. There would be little, if any, addition to the perils of the streets, but the scheme would reduce to a minimum the dangers from the skies.

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TRADE AFTER THE WAR.

At a meeting recently held at the Mansion House to discuss "after the war" problems in connection with the engineering industry, a considerable number of proposals were made for safeguarding the future of what the Lord Mayor very rightly described as the main bulwark of European freedom. It must be generally recognised that it is essential that British engineering should have a prosperous future, and that the industry should become the employer of more and more skilled men. It must also be recognised that we shall presently have to face a very difficult and possibly dangerous position altogether apart from the war itself, though following upon it as a natural consequence.

The problem of employment will be very difficult to solve, and cannot be solved at all without a fair degree of co-operation between employer and employed. While recognising the handicap under which British engineering must necessarily labour until restriction of output becomes a thing of the past, we cannot in common fairness fail to realise the point of view of men, who fear that by increasing individual output they will also increase unemployment. This would, of course, happen unless markets were widened in proportion to the rise of output, and many proposals have already been put forward as to how this desirable result could be brought about.

At the meeting in question many of these proposals were only touched upon lightly. These included schemes of protective tariff and the constitution of a ministry specially charged with the duty of watching over our industry. A policy thoroughly concrete in character and very interesting to all officials of municipal enterprises was outlined by the Lord Mayor of Manchester.

The Manchester Corporation has adopted a standing order applicable to all its departments. It is to the effect that no contract may be entered into by the departments of the Corporation with any person of Austrian or German nationality, or with any company of which a substantial proportion of the share capital is held by subjects of countries at present at war with us. The Manchester Corporation have circularised other similar bodies, suggesting the general adoption of the same policy. Meanwhile, one may reasonably anticipate that sections of the British engineering industry, including particularly the manufacturers of rail and road vehicles, have already urged or will urge upon the Government the enforced adoption by all public bodies of what might be described as a national policy. Hitherto firms of foreign origin have almost invariably been free to tender for the supply of railway or tramway plant, or of road motor vehicles for municipal service. British manufacturers would naturally advocate a restriction which would keep the whole of such business inside this country.

There are plenty of parallel instances to act as precedents. Thus, for example, in France practically all, if not quite all, the public service motors owned by municipalities, or running under agreement with municipalities, must necessarily be wholly constructed in France by French labour. In this way a very valuable nucleus of a fleet of military motors was built up under conditions not nearly so favourable as those obtaining here. The outstanding instance is that of the General Omnibus Company of Paris. In this case, as readers are aware, the company has the monopoly of running public service motors, and pays a substantial sum annually for the privilege. The frequency of the service is regulated, as are also the conditions of employment. Restrictions are imposed as to the main features of design of the vehicles, and even the bodies were, to all intents and purposes, designed by the military authorities with an eye to their own possible requirements.

In Great Britain a policy of this kind is not so absolutely necessary because the distribution of our population is very much more favourable to the extensive use of public service motors. There is also a much bigger field for the tramway as distinct from the light railway of the type familiar to all visitors to Belgium before the war. In a lesser degree perhaps, but certainly in a degree not negligible, it would be desirable that municipal fleets of motor omnibuses in this country should be such as to be of real help for national defence in times of emergency.

This points to the desirability of restricting purchase to British-built machines, and going further than Manchester itself has gone, along the lines that Manchester has suggested. The danger in connection with any such restrictions lies, of course, in the possibility of manufacturers getting together in a sort of ring for pushing up prices. It is conceivable that, short of an arrangement completely restricting municipal purchase to British machines, some scheme might be framed which would have the effect of giving a preference to home manufacturers on some agreed scale of percentage. Thus, attempts to rig prices would at least be strictly limited in scope. Beyond this it would be necessary to rely to some extent on the good sense of manufacturers who would, it is to be hoped, realise that permanently increased output is not compatible with organised attempts to obtain extortionate profits. The whole idea, whether carried to its logical conclusion or only taken as far as Manchester has taken it, is one that is well worth the careful consideration of all municipalities. Short of legal compulsion by some Parliamentary Act or Departmental Order, municipalities could, if they so desired, set an example in the right direction with a view to helping in the great problem of employment. Similarly, the officials of such municipalities have at any rate advisory powers which would enable them to do good work along the same lines.

The Producers' Organisation.

The British Empire Producers' Organisation is now vigorously at work, and the preliminaries being over, useful results should follow. It has been arranged to issue monthly reports to the various associations affiliated. We have received a copy of the first of these reports, which covers the period from the founding of the Organisation in the end of last year till the present time. The Right Hon. W. M. Hughes, Prime Minister of Australia, is patron of the organisation, and there is a highly influential list of vice-presidents and Council, the chairman of the latter being Mr. C. T. Parker. The two principal objects are to make the Empire self-supporting and to remove from our industry and commerce all German influence and control. A beginning, it may be recalled, was made with organising the sugar industry of the Empire. Important representative meetings were held in London, Glasgow, and Liverpool. In July a British Agricultural Section was organised, and in August the Council passed a resolution declaring that labour is entitled to its full share of any benefit which may be obtained through preference being given to any industry. Steps are being taken for the formation of a number of sections, including one for iron and steel. The Organisation promises to do much good work, and its general secretary, Sir George Macgill, is showing great energy.

A British Trade Bank.

One of the most interesting, and, as it is likely to prove, important events of September in the movement

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for fostering British trade was the issue of a report by Lord Faringdon's Committee recommending the formation of a British Trade Bank with a capital of £10,000,000. The Committee was composed of eminent bankers and financiers, and its proposals and discussion of the subject are of great interest. Moreover, they ought to command the assent of the Government. The object in view is to provide means for meeting the needs of British firms after the war as regards financial facilities for trade, particularly with reference to the financing of large oversea contracts. By financial facilities the Committee mean those involving a longer currency than those afforded by ordinary banks. The Committee point out various ways in which the proposed bank can help traders and develop industry, and among its functions would be the working of an information department and the examination of industrial projects. This great scheme, apart from some criticisms on points of detail, has been received with much favour in financial and industrial circles. If carried out it should prove of immense value.

RUSSO-BRITISH TRADE.

In view of the substantial financial interests which this country has in Russian undertakings, including tramways among other things, satisfaction must be expressed at the formation last month of a Russo-British Chamber of Commerce in London. Under most influential auspices it will promote trade and commerce between the two empires.

MINERALS AND METALS.

It is sincerely to be hoped that the representations which have been made to the Advisory Council for Scientific and Industrial Research by the Iron and Steel Institute, the Institution of Mining Engineers, the Institute of Metals, and the Institution of Mining and Metallurgy will have some effect. In place of the multitude of Government Departments and Committees dealing with industries of the kinds represented, the institutions advocate the formation of a central Department of Minerals and Metals, so that overlapping and confusion may be prevented and efficiency promoted.

"SAFETY FIRST" MOVEMENT.

LONDON GENERAL OMNIBUS CINEMA FOR SCHOOLS.

A representative of the London General Omnibus Company informed the coroner at Tottenham that the company had engaged a special staff to point out to children the dangers of the streets, and intended shortly to send lecturers to the schools to illustrate with cinematograph films how these risks could be avoided. This statement was made at an inquiry into the death of a child who was killed in a street accident. The announcement will not come as a surprise to the many members of the Tramways and Light Railways Association and the Municipal Tramways Association, who visited the L.G.O. Company's training school on the occasion of their annual meetings in London this year. Mr. H. E. Blain, the operating manager of the company, then explained the work that had been carried out in connection with the "Safety First" campaign, and gave statistics showing that since 1910 it had reduced the number of accidents by 68 per cent. That figure has been a constantly-improving one each year, and there are now only 2·15 accidents per 10,000 miles run for the whole fleet of omnibuses. By means of an exhibition of films of reconstructed accidents and of correct and incorrect methods of employees' work, Mr. Blain enabled his auditors to appreciate what a great part the moving picture film has played towards bringing about a reduction in the accident rate. Another contributory cause was the distribution of "Safety First" literature in the elementary schools. The latest films reproduce representations of every type of accident that has occurred on omnibus routes during the past two years, and it is these that are going to be exhibited in the schools. Free use of the films is also offered to the proprietors of picture theatres in London. Among the older pictures are several showing unsafe methods of working omnibuses on tramway routes of the London traffic group.

ILLUMINATED CAR IN SHANGHAI.

An illuminated car of an attractive and original design was run on the Shanghai tramways on the occasion of the King's birthday this year. As the photograph shows, the car (for which Mr. Donald McColl, general manager of the Shanghai tramways, was responsible) was an exceptionally fine piece of work. A painting of the King was mounted high up at each end of the vehicle, and it was illuminated from behind by electric lamps and flanked by a Union

Jack. Underneath each portrait, in large letters formed of white electric bulbs, appeared the words "God Save the King." Between the floor and the canopy of the car was mounted a huge globe which was slowly revolved, one half always being illuminated by the sun. The globe was painted in different colours so that the sea and the continents were clearly shown, the most vivid of all being the portions of the British Empire, which were in red with Union Jacks over them.

BRADFORD RAILLESS CARS.

In his annual report, Mr. C. J. Spencer, general manager of Bradford Corporation Tramways, states that the total cost of operation for the railless trolley cars was 7·9d. per car mile. This sum includes interest and sinking fund charges, and he considers that it will compare favourably with petrol omnibus figures published this year. The report adds that 2,689,484 passengers were carried at fares approximately half the rates charged on most motor omnibus undertakings. There are 20 railless traction cars in use, and the total length of the five routes was 9 miles 790 yards. The longest route is 2 miles 1,232 yards, from Foster Square to Frizinghall, including a loop round Gaisby Lane, etc. June 24, 1911, was the date when the system was opened for traffic. The appended statement shows the expenditure and receipts for the past two years:—

	1914–15. Average per mile.	1914–15. Expenditure.	1915–16. Average per mile.	1915–16. Expenditure.
	d.	£	d.	£
Traffic expenses	3·162	2,340	3·078	4,131
General expenses	·616	456	·566	759
Repairs and maintenance ...	1·955	1,446	1·748	2,348
Power expenses	·824	610	·843	1,132
Total	6·557	4,853	6·235	8,375
Balance	—	—	·301	404
INCOME.				
Traffic revenue	5·830	4,315	6·536	8,779

The mileage was 322,390, as compared with 177,653 in 1914–15.

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THE MUNICIPAL TRAMWAYS ASSOCIATION

(INCORPORATED)

Fifteenth Annual Conference, held in London, September 21st and 22nd, 1916.

For the second time in succession owing to the great European war the Municipal Tramways Association held its annual conference in London. In normal times it would have visited Dundee, the home of its president for the past year, but under present conditions it was more convenient for the members to meet in London; and to minimise the demands on their time as much as possible the programme was confined to two days. The fifteenth annual conference, of which a full report is given in the following pages, was opened on Thursday morning, September 21, in the Hall of the Surveyors' Institute, Westminster, S.W., where the members met a year ago. President Fisher took the chair at 10.30, when the hall was well filled by members and delegates. In welcoming the vice-chairman of the London County Council, Mr. Fisher alluded to the illness of Mr. A. L. C. Fell, chief officer of the London County Council tramways and a former president of the Association. Mr. W. J. Squires, in reply, said that Mr. Fell had been ordered away for a six months' sea voyage. He was sure that everyone connected with the tramway industry wished him a speedy recovery and a return to his work. On the motion of Mr. J. B. Hamilton, the secretary was directed to forward an expression of the sympathy of the members to Mrs. Fell.

The President then began the delivery of his address, but owing to severe throat trouble from which he had been suffering for a few days he relinquished the task, and the reading was completed by the hon. secretary. In the course of his address Mr. Fisher touched upon the work of the year, and alluded to the important problems arising out of the war. He mentioned the success of the Council in effecting the extension of the term "munition work" to cover tramway facilities, and said that no fewer than forty-four municipal tramways were certified under the Munitions of War (Amendment) Act, 1916. It was not always realised how important a part tramways were taking in the national crisis in carrying munition workers, while over 38 per cent. of tramway workers were in H.M. Forces. As to the problems which would arise in the future, no one could do more than conjecture. One thing was certain; victory in the field would not put an end to strenuous life and industrial enterprise. The history of municipal tramway enterprise had been a history of progress and improvement, and he had no doubt that tramway authorities would be able to do much to assist British brains and ingenuity through the important channel they represented. A sympathetic allusion to those who had fallen in the war closed an interesting address, which was marked by a strong but reasonable spirit of optimism as regards the future.

Mr. J. M. McElroy then read a paper which he had entitled "Some Notes on Passenger Transportation in Large Cities." A number of diagrams were included, which afforded a useful comparison of transit statistics. The paper had evidently required much research, and it was listened to with close attention. The principal difficulties met with in planning and extending traffic systems were noted. In all large cities congestion would take place sooner or later; when the arterial roadways had been utilised to the utmost, saturation point would be reached. Then new arteries must be opened out, and subways or tube or elevated railways would become necessary. Each city presented its own problems; it was dangerous to rely on plans adopted elsewhere. Tramway feeders would always be required, and they must be so placed as to maintain a supply of passengers at important junction points with other means of transit. Motor omnibuses would be of assistance in certain circumstances. The difficulties of rush-hour traffic were discussed, and the importance of tramways in dealing with it was insisted upon. A plea was made for new legislation in order to relieve municipal tramway undertakings from unfair burdens now placed upon them. Particularly was it desirable that there should be a permanent authority to direct negotiations for the carrying out of new schemes for transit facilities.

Mr. H. H. Gordon, of the London County Council, opened the discussion in an interesting and informing speech, and he was followed by Messrs. Harrison Barrow, Montgomery, Smith, Wale, and Hamilton.

In the afternoon Mr. G. W. Holford read a paper on "The Utilisation of Tramways for Goods Traffic," which had been prepared jointly by himself and Mr. W. Clough. The authors surveyed the subject in the light of what had been written and done up to the present time, and they presented a strong case for a forward movement. Figures were given to show how moderate loads could be handled cheaply on existing systems. Special reference was made to work at Leeds, Huddersfield, and Burnley, and to the railless trolley vehicle introduced by Mr. Spencer at Bradford with marked success. The paper is given in full in the following pages, and it merits careful study.

The discussion was opened by Mr. C. J. Spencer. Other speakers were Messrs. Montgomery, Mozley, Hamilton, Wilkinson, and Clough who replied to the discussion.

At the business meeting on Friday the report of the Executive Council, which is appended to our report, was, after some discussion, unanimously adopted. It is a very satisfactory record of a busy year, in which the Council has well served the Association.

The election of officers was carried out in the usual business-like manner with a minimum loss of time. Mr. Henry Mozley, general manager of Burnley Corporation, who was unanimously elected president for the ensuing year, has long been a member of the Executive Council. His tramway career began in the days of steam traction, and he has witnessed, and been instrumental in carrying out, some useful changes in tramway equipment and methods. Several innovations at Burnley have been adopted elsewhere, for Mr. Mozley has never been reluctant to communicate his ideas to his colleagues. His election to the presidency of the Association is an indication of the esteem in which he is held by the members. The election of Alderman J. Miles, J.P., chairman of Bolton Corporation Tramways, as vice-president, was unanimous, and was a testimony to the appreciation of the members of the valuable aid which he has rendered as a member of the Executive Council. The vacancies on the Council were filled by the election of the following:—Sir John

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Courtis, Messrs. William Clough, W. J. McCombe, Jas. Dalrymple, and T. B. Goodyer.

Mr. C. J. Spencer consented, at the earnest request of the members, to retain the position of honorary secretary, and he was accorded a cordial vote of thanks for his services during the past year.

A vote of thanks was also awarded to the president for his able conduct of the affairs of the Association during his year of office.

A RETROSPECT.

Now that the association has held its fifteenth annual conference, a glance at its history may be of interest, especially to those of its members whose connection with it is comparatively recent. Fifteen years is not a great span in the life of an institution, but in this period the association has attained an even greater importance than its founders anticipated. Its rapid growth in membership and influence is due in a large measure to a step wisely taken soon after its formation, which enlarged its scope and identified it completely with the interests of all municipal tramways. Its beginning was, however, on a modest scale. On March 21, 1902, the Association of Municipal Tramway Managers of Great Britain was formally inaugurated at a meeting of twenty managers held in Manchester. The movement was due mainly to Mr. John Young, then general manager of Glasgow Corporation Tramways, though Manchester was the birthplace. It turned out that the meeting which gave birth to the infant—now grown to such size and influence—was the outcome of a small informal gathering which had been held, also in Manchester, on the first day of the same month. As a matter of historic interest, it is worth recording the names of those who attended that preliminary meeting—pioneers in a great developing field, one or two no longer with us, others transferred to new spheres of industry, others again still in the same towns that they then represented. They were J. Aldworth, Nottingham; A. Baker, London; C. R. Bellamy, Liverpool; A. L. C. Fell, Sheffield; E. Hatton, Salford; J. M. McElroy, Manchester; W. Wharam, Leeds; and J. Young, Glasgow.

The result of that preliminary meeting was that a circular letter, signed by Mr. Young, was sent to all the municipal tramway managers in Great Britain. They were not so large a band as they are to-day. This letter suggested that an association should be formed for the acquisition of experimental, statistical, and scientific knowledge relating to the construction, equipment, and operation of tramways, and for the diffusion among its members of information on all subjects affecting tramways. The meeting of March 21 adopted a constitution and by-laws, and it was provided that the membership should be confined to municipal tramway managers and such of their principal assistants as they might recommend. Twenty-one managers were elected members of the association, with Mr. Young as president, Mr. Bellamy as vice-president, and Mr. McElroy as secretary for the year.

A little more than three months later, namely, on July 3 and 4, 1902, the first annual conference of the association took place at the Agricultural Hall, Islington, London, where the second tramway and light railway exhibition promoted by the TRAMWAY AND RAILWAY WORLD was at that time being held. Appropriately enough, a conference of the Permanent International Tramway Union—the only one which that body has ever held in this country—was taking place about the same time and at the same venue. The meeting of the Tramway Managers' Association was attended by 31 members.

A very important step was taken in 1903. At a meeting of the association held in Leeds on March 27, it was agreed to widen the scope of the association. Its title was altered to that of the Municipal Tramways Association of Great Britain, and it was provided that ordinary members should include municipal corporations or other local authorities owning and working tramways, each local authority to be represented by the chairman or deputy chairman of its tramway committee. Thus the possible membership was much enlarged, and at the same time a more popular element was added to the purely technical, official, and administrative atmosphere. Experience has proved that the change was a wise one. The towns thus federated can recognise that the association is theirs, and not merely a society of experts in their employment. At the same time the practical and professional nature of the association has not been impaired, and politics has been rigidly excluded. The papers and discussions have been enriched by the contributions of tramway committee chairmen, while the professional element has kept the association strictly tuned up to its fundamental purpose. The latter feature was aided by the formation at the same meeting of a managers' section.

After this the membership grew rapidly, and before long nearly every local authority working tramways was a member of the association. The annual conferences were marked by the reading and discussion of a wide variety of papers relating to tramways, both on the engineering and the traffic sides. Each year the conference was held in a different town, and the manager of the tramways in that town was the president for the year. Tramway traffic grew enormously and tramway problems developed correspondingly. In dealing with these matters the executive of the association had plenty of work, and the results of their labours were brought before the annual conferences. Special committees considered and reported on specific matters of importance referred to them, including, of course, all tramway subjects involved in legislation or Government action.

So things went on till the outbreak of the European War in 1914. It had been arranged that the conference of that year should be held in Salford. By a recent innovation municipal as distinguished from professional representatives had become eligible for the presidency, and the president for that year was Alderman H. Linsley, chairman of Salford Tramways Committee. In view of the upheaval caused by the outbreak of the war the holding of the conference was cancelled, but the annual business meeting was held in Salford on November 13, when all the officers were re-elected for another year. In 1915 it was found practicable to resume the conferences, though on a limited scale. The peripatetic scheme of places of meeting was for the time abandoned, and a short conference was held in London last year.

As an addendum to this retrospect we give the dates of all the conferences, the names of the towns in which they were held, and the names of the presidents:—

Date.	*Place.*	*President.*
July 3-4, 1902	... London	... Mr. J. Young.
July 8-10, 1903	... Glasgow	... Mr. J. Young.
Sept. 27-29, 1904	... Liverpool	... Mr. C. R. Bellamy.
July 4-6, 1905	... London	... Mr. A. Baker.
Sept. 19-21, 1906	... Leeds ...	... Mr. J. B. Hamilton.
Sept. 25-27, 1907	... Manchester	... Mr. J. M. McElroy.
Sept. 23-25, 1908	... Nottingham	... Mr. J. Aldworth.
Sept. 22-24, 1909	... London	... Mr. A. L. C. Fell.
Sept. 21-23, 1910	... Bradford	... Mr. C. J. Spencer.
Sept. 27-29, 1911	... Glasgow	... Mr. J. Dalrymple.
Sept. 25-27, 1912	... West Ham	... Mr. H. E. Blain.
Sept. 23-26, 1913	... Sheffield	... Mr. A. R. Fearnley.
Business meeting 1914	Salford ...	... Ald. H. Linsley.
Sept. 23-24, 1915	... London	... Ald. H. Linsley.
Sept. 21-22, 1916	... London	... Mr. P. Fisher.

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THE MUNCIPAL TRAMWAYS ASSOCIATION.

THE CONFERENCE.

The 15th annual conference of the Municipal Tramways Association (Incorporated) was held at the Surveyors' Institution, Great George Street, London, S.W., on Thursday, September 21, and Friday, September 22, 1916. The President of the Association, Mr. Peter Fisher, general manager of the Dundee Corporation Tramways, presided. Those present included the following :—

LIST OF DELEGATES.

Aberdare	A. J. Abraham, general manager.
Ashton-under-Lyne	Ald. R. S. Oldham, chairman. Ernest Holt, general manager.
Bexley	H. P. Stokes, engineer and manager.
Birkenhead	Coun. H. Halsall, chairman. Cyril Clarke, general manager.
Birmingham	Coun. H. Barrow, chairman. A. Baker, general manager.
Blackburn	Coun. Higham, vice-chairman. J. H. Cowell, general manager.
Bolton	Ald. John Miles, J.P., chairman. Coun. J. R. Horrocks, member of committee. J. Barnard, general manager.
Bradford	Coun. E. Priestley, J.P., chairman. Coun. J. Lund, vice-chairman. C. J. Spencer, general manager. J. W. Falkingham, assistant secretary M.T.A.
Burnley	Henry Mozley, general manager.
Burton-on-Trent	A. B. Slater, general manager.
Bury	Ald. T. S. Collinge, chairman. Coun. H. Hargreaves, vice-chairman. William Clough, general manager.
Cardiff	Ald. Sir J. W. Courtis, J.P., chairman. Arthur Ellis, engineer and manager.
Chester	W. H. Ellis, traffic manager.
Chesterfield	R. L. Acland, general manager and engineer.
Colne	T. G. Richardson, general manager.
Coventry	Coun. C. V. Pugh, J.P., chairman. Coun. H. W. Wale, vice-chairman. T. R. Whitehead, general manager.
Croydon	Ald. G. J. Allen, J.P., chairman. T. B. Goodyer, manager.
Derby	J. Dean, chairman.
Dundee	Coun. G. A. Johnston, chairman. Peter Fisher, general manager.
East Ham	Ald. M. Oakes, J.P., chairman. W. C. Ullman, engineer and manager.
Exeter	Ald. H. B. Varwell, chairman. H. C. Bartlett, general manager
Glasgow	Coun. Montgomery, chairman. Bailie Thos. Kelly, vice-chairman. Jas. Dalrymple, general manager.
Halifax	Ald. C. F. Spencer, chairman. Ald. A. Fawcett, vice-chairman. J. D. Caird, traffic manager. J. W. Galloway, tramways engineer.
Huddersfield	R. H. Wilkinson, general manager.
Hull	William J. McCombe, manager.
Ilford	L. E. Harvey, manager and engineer.
Ilkeston	S. F. James, town clerk, hon. solicitor, M.T.A.
Keighley	Coun. A. Smith, chairman. Harry Webber, general manager.
Leeds	Ald. H. Brown, vice-chairman. Coun. C. G. Gibson, member of committee. J. B. Hamilton, general manager.
Leicester	Ald. S. Flint, chairman. Ald. G. Banton, vice-chairman. A. F. Lucas, manager. T. R. Smith, engineer.
Leyton	F. Schofield, manager.
Liverpool	Coun. E. Russell-Taylor, J.P., C.C., chairman. Ald. F. Smith, J.P., vice-chairman. C. W. Mallins, general manager.
London County Council	H. Gordon, dep. chairman of the Council. W. J. Squires, J.P. J. K. Bruce, dep. chief officer of tramways. L. Slattery, traffic superintendent.
Maidstone	A. T. Lambert, general manager.
Manchester	Ald. A.W. Chapman, M.D., vice-chairman. J. M. McElroy, general manager.
Newcastle	Coun. R. Mayne, chairman.
Newport	N. J. Young, general manager.
Northampton	Coun. T. D. Lewis, chairman. John F. Cameron, general manager.
Nottingham	J. Aldworth, general manager.
Plymouth	Coun. J. Moon, vice-chairman. C. R. Everson, general manager.
Portsmouth	Coun. J. Timpson, chairman. Ald. R. Payne, vice-chairman. W. R. Spaven, general manager.
Preston	Coun. T. Parkinson, vice-chairman. J. F. Simpson, engineer and manager.
Reading	Ald. C. G. Field, J.P., chairman. G. F. Craven, gen. manager and engineer.
Rochdale	Ald. James Taylor, chairman. George Webster, general manager.
Salford	Ald. Linsley, J.P., chairman. G. W. Holford, general manager.
Sheffield	Ald. Jas. Knowles, chairman of engineering sub-committee. A. R. Fearnley, general manager.
Southampton	Ald. Dunsford, J.P., chairman. W. T. Robson, general manager.
South Shields	J. C. Whiteley, manager.
Stalybridge	Ald. R. Wood, chairman. R. Blackmore, engineer-in-chief.
Wallasey	Coun. H. W. Griffin, vice-chairman. R. R. Greene, general manager.
Walsall	R. L. Horsfield, general manager.
Walthamstow	Coun. R. J. Bishop, vice-chairman. Wm. Murray, manager.
West Ham	H. W. Littler, ex-chairman, and member of the Executive Council. J. S. D. Moffet, general manager.
Wigan	F. Buckley, general manager.
Wolverhampton	C. Owen Silvers, general manager and engineer.
York	J. W. Hame, engineer and manager.

The PRESIDENT, in opening the proceedings, said :—Our hon. secretary has some announcements to make, but just before he makes them will you allow me to say how gratifying it is to see so many municipalities represented here this morning. You may take it that that is an expression of the interest they have in our Association, and the work that is carried on by that Association in relation to tramways. We have also one or two strangers with us, and we all offer them a very hearty welcome. Amongst the assembly this morning we have the deputy-chairman and the vice-chairman of the London County Council. I am sure we all feel honoured by them seeing their way to grace our proceedings with their presence. Since I came into the hall I have heard that our friend Mr. Fell has had a relapse. I know nothing of its nature, but perhaps his vice-chairman, who is present with us, will tell the Conference what this means.

Mr. W. J. SQUIRES (London County Council) :—Mr. President and gentlemen, it was with very great regret that I had to report to your secretary this morning that Mr. Fell had a rather serious relapse last week. I know the testimony which you have paid to Mr. Fell on former occasions, and I am sure this morning that everybody will agree with me that we are very sorry indeed to hear of this. He has now been ordered away for a six months' tour, and you, sir, and I trust every member of this Conference, nay, everyone connected with tramway undertakings, will express only this wish, namely, that Mr. Fell may return to those duties in which he has a great responsibility, and I am sure when he does that the London County Council will again welcome him to his work. (Hear, hear.)

Mr. J. B. HAMILTON (general manager, Leeds City Tramways).—May I take this opportunity, which I do most readily, to ask this meeting, through its secretary, to forward to Mrs. Fell their expression of sympathy and their hope that Mr. Fell will return with renewed vigour.

The PRESIDENT.—Will some gentleman second that ?

Mr. H. E. BLAIN.—If I may be allowed, in response to your call, to second that, I shall do so with very great cordiality. I feel sure that all have felt very deeply indeed the severe illness which Mr. Fell has undergone, and that we all desire to show him by this cordial expression of sincere sympathy the esteem in which we hold him.

The PRESIDENT.—I am sure we all join with the mover and seconder in expressing our regret at Mr. Fell's illness, and we trust that the voyage he is undertaking will be the means of a speedy and complete recovery.

The motion was then carried unanimously.

The SECRETARY (Mr. C. J. Spencer) then announced an invitation from Mr. Blain, of the London General Omnibus Company, to the members of the Conference to visit the training school at Chelsea, of which several delegates availed themselves in the afternoon. A letter also had been received from Mr. Stokes, manager and engineer of the Bexley Tramways, inviting the delegates to view the working of Wood's-Gilbert rail grinder and planing machine on

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the Bexley tramways. It was also announced that an invitation had been extended by the London County Council to the delegates to inspect the Council's trailer car system, the generating station and the central car repair depot.

The PRESIDENT, who was greeted with applause upon rising, said :—Gentlemen, unfortunately I have a bad throat this morning, and have had for two days. It is better at present or else I would not make even an attempt to read this address to you ; but seeing that you have a print in your hands I will try to read it myself.

PRESIDENTIAL ADDRESS.

BY MR PETER FISHER
(General Manager, Dundee City Tramways).

The great European war is still being waged with as great, if not greater, intensity as when we last met in conference, and in consequence of its overshadowing influence our Conference meets here to-day instead of, according to the usual procedure, in Dundee. We can only regret the necessity for the continuance of this great conflict, but in the interests of humanity and civilisation and fidelity to the written or verbal obligation the Allied Powers must be organised solely for the purposes of the war until their efforts are crowned with victory, and an honourable and lasting peace obtained on terms laid down by the Allies.

As you will see from the annual report of the Executive Council, a large proportion of the work of that body during the past year has been in relation to problems arising out of the war, i.e., supply of tramway tickets, tramway tire supplies, retention of tramway employees, Munitions of War (Amendment) Act, 1916, classification of tramway material, women as tramcar conductors, Lights (Vehicles) Order, 1915, British trade after the war, and disabled soldiers and sailors. Several of these matters deserve more than passing notice. In connection with the Munitions of War (Amendment) Act, 1916, your Council, with valuable outside assistance, were successful in getting the term "munitions work" extended to cover "tramway facilities." No fewer than 44 municipal tramway undertakings are up to this date certified under the Act, and many others are authorised to issue Class "B" Priority Certificates to facilitate the delivery of supplies for maintenance.

We, as tramway authorities, recognise that in this crisis our point of view must be primarily to give our services to the nation, both in the way of supplying munitions and in keeping industry alive. It is not always realised by the average man that tramways are to-day playing a very important part in the national crisis in carrying workpeople from their homes to the factories and *vice versa*. Workpeople are to-day in all probability working harder and more strenuously than at any other period in history, and if the journey from their homes to the factory and back had in all cases to be undertaken on foot, the nation would feel a serious reaction in reduced output. It is therefore very gratifying that the Government have realised the great importance of tramway undertakings and have given them such facilities as enable them to keep going.

The Lights (Vehicles) Order, 1915, was in its original form such that the tramway authorities in order to comply with it would have been put to the necessity of making considerable expenditure, and that at a time when the staffs in their workshops are depleted. There is also the additional difficulty of obtaining materials for the work.

Other matters affecting tramway interests and the interests of this Association, as you will see from the report in your hands, have been dealt with by the Executive Council.

The past year has not been fruitful in developments and extensions so far as tramways and other passenger-carrying facilities are concerned. The most outstanding features of the year are the readjustment of tramway fares and stages, the employment of females on a large scale, and the introduction of volunteer labour for driving, the latter innovation having been introduced in Birmingham, Newcastle, and Bradford, where 320 auxiliaries are employed with quite satisfactory results.

During the year proposals for increasing the fares, shortening the stages, or abandoning halfpenny fares have been considered by various tramway authorities. In several cases changes have been made whereby the average fare per passenger has been materially increased, and in all these cases additional revenue has been the result.

Strange as it may seem, some authorities have actually been considering the decreasing of fares and the cheapening of tramway facilities. It is remarkable that, in the main, tramway fares have not increased very seriously. Tramway travelling, indeed, is about the only commodity that has not been generally increased. Having regard to the increased working costs consequent on higher wages and bonuses to employees, war allowances to dependants of men who have joined the colours, and the largely increased cost of tramway supplies, it is not surprising that the question of increasing tramway revenue should demand the attention of those operating many tramway systems.

Present conditions provide ample justification for suggesting that the existing low fares should be adjusted so that the increased costs should be fully met. While the accounts of most municipal tramway undertakings look fairly satisfactory, still it must be admitted that much necessary expenditure is only suspended till the end of the war.

There are now 8,609 females employed on tramways, as follows :—8,433 as conductors and 176 as drivers. The splendid manner in which women have taken up this work, and the facility with which they have adapted themselves to this new employment, has earned for them the approbation of the tramway authorities and the tramway patrons.

Some idea as to the part tramways are taking in the great conflict may be obtained from the following figures :—

Number of men who have joined H.M. Forces	20,905
Percentage to total	38
Number of men who have joined munition factories ...	1,893
Percentage to total	3½
Amount paid to dependants of employees	£854,649
Average allowance per man per week	10s. 7½d.
Collected on cars for national and other objects ...	£43,800
Collected and contributed by employees to relief funds	£36,070

In addition to the above, tramways are doing much to assist the national cause which cannot be expressed in figures. The services

Mr. Peter Fisher,
President of the Municipal Tramways Association.

rendered in making provision for the carrying of munition workers and others engaged in important national work is a case in point.

What of the future? Changes will come. The war certainly will not only be an interruption of what formerly existed. What will be the precise nature of the problems which, when they emerge, must be boldly faced, no one can forecast. It is a matter still in the region of conjecture.

It may be hazarded that no two men's views of the future will harmonise, and this need not surprise us, for, although Britain and her Allies have now wrested the initiative from the Central Powers, never, let us hope, to lose it, the nature of the settlement can hardly yet be gauged. One thing certain is that victory in the field will not put an end to the strenuous life in industrial enterprise.

Germany, faithful to her motto of "thorough," will make a determined effort to regain in the market-place what she has lost on the battlefield. Competition will be as keen as in bygone days, and although in the strict sense of the word we, as tramway operators, are neither manufacturers nor merchants, I have no hesitation in predicting that we will be able to do much to assist

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British brains and ingenuity through the important channel of public service which we represent.

The history of municipal tramways is a history of progress and improvement. Sometimes we were tempted to think that everything had been done which could be done, and yet in tramway enterprise, as in all other departments of human affairs, there is no such thing as finality. For two years the war has dominated everything, but when peace returns pressing problems will present themselves to us in their true perspective, and these will probably involve adjustments such as we scarcely dreamt of in pre-war days.

Simultaneously with the cessation of hostilities various problems relating to our employees will present themselves. For example, the question of war wages and bonuses, and the position to be taken up regarding our men who may be in receipt of pensions but still able to perform certain duties. As I have before remarked, other and more important problems will emerge later on which no one can possibly forecast.

I have not a shadow of doubt that municipalities will sympathetically consider the above questions, and it is to be hoped that friendly conferences between all interested will from time to time take place, and, with a spirit of reasonableness of "give and take," will act as lubricants to all those negotiations which will undoubtedly have to be faced.

It is extremely appropriate that one of the papers to be submitted to the Conference to-day deals with the important question of goods transportation on tramways. The services which can be rendered to the country by using the tramways to their fullest extent in this connection can only be appreciated when the subject is considered on lines such as were outlined by the late Mr. Bellamy in his presidential address at the Conference in Liverpool in 1904.

The development of tramways from a passenger-carrying point of view has occupied our attention almost entirely in the past. Now the other point of view, viz., transit, such as tramways can offer for goods, should have our fullest consideration. On the face of it it appears reasonable to say that if a tramway is of value for picking up passengers from railway stations and other points, and depositing them at their destinations, it should be equally true in the case of goods. In fact, one might suggest that in the tramway undertakings in the country the railway companies have a suitable instrument for detail distribution which could be used to mutual advantage and to great public convenience. In the days to come, when economic competition between nations will in all probability be even fiercer than in the past, transit will undoubtedly play an important part.

The writers of a book on the "Coming Trade War" contend that cheap and efficient production is attained by the influences of five sciences, one of which is "transportation." We are essentially transport men, and upon our ability to assist will depend to a considerable extent the success of the nation in the economic fight of the future. Relaxation of restrictions and regulations may be necessary to enable tramways to play the important part they are destined to do, but when national interests are involved there should be no difficulty in this respect.

It seems a little doubtful whether the Government have yet realised the very great assistance which tramways throughout the country can render, even at the present time, as a transit instrument for goods as well as passengers. Railways are crowded with traffic of all kinds, and considerable complaint is heard all over the country regarding the delays that are taking place. It is therefore just a little surprising that the Government have not seriously considered the usefulness of the various tramway undertakings for the carriage of munitions and general merchandise.

No doubt the paper to be submitted to the Conference later in the day by Messrs. Holford and Clough will be keenly debated in this assembly, and it is to be hoped that it will appeal to even a larger audience than that contained in this room.

As Britishers it is gratifying to us to note the schemes now adumbrated for the protection of the maimed and incapacitated through taking part in the war, but for those who return fit for work suitable employment must be provided. In addition to those who left our service for the army it will be up to us to do all in our power to assist others who have endured such hardships and suffering in the cause which prompted Britain to enter the war.

I feel that I cannot close without making reference to those of our men who have fallen in the conflict. We offer our condolences to their relatives and friends who have been bereaved, and who have also been denied the sacred privilege of paying their last respects to their loved ones, many of whom did not even get the kindly sod in "God's acre"—no wreaths, no tears, no priest, and no mourning congregation. Our brave are scattered over the whole war area. Someone has said, "Our battles have been won by the men who fell." They are gone; we will cherish their memory. They lived "the one crowded hour of glorious life" which "is worth an age without a name."

I would also like to take the opportunity of recording my appreciation of the honour conferred upon me in appointing me as president of this important Association, and to express my gratitude to the Executive Council and to our Hon. Secretary for their many kindnesses and whole-hearted support throughout my year of office.

Alderman S. FLINT (chairman Leicester Corporation Tramways), after expressing the sympathy of the members with the president in the disability under which he was labouring through having taken a rather bad cold, said:—The address to which we have just listened is not open to us to criticise, but one may say this, that we are under a very great debt to our president for bringing it before us. It is full of points of interest, and I think opportunities will probably be given during the Conference when some of these points may be enlarged upon to the general advantage of the conference. With the last clause but one in the address we all at once deeply sympathise. It expresses our feelings in most beautiful terms. I suppose, perhaps, there are scarcely any of us here but who enter into them very deeply. I myself have four sons in the army, and a daughter serving abroad. Three of them have been wounded, and I appreciate most sincerely the touching remarks made in this paragraph of the president's address. As I say, we owe a debt to our president, and I have great pleasure in moving, in this brief way, that we give him our hearty thanks for the address he has read to us this morning.

Mr. J. DALRYMPLE (general manager, Glasgow Corporation Tramways).—I have very great pleasure in seconding the vote proposed by Mr. Alderman Flint, and I wish to add my expression of thanks to the president for his able *résumé* of the position at present as it has presented itself to him, and for the very thoughtful and sympathetic reference which he has made to the points that are likely to take up our attention in the near, I hope the very near, future. I beg to second the motion.

Mr. H. MOZLEY (vice-president).—I have very great pleasure in putting this motion to the conference. I am sure you will agree to it unanimously.

The vote of thanks to the president for his address was then put to the conference, carried by acclamation, and conveyed to the chair.

The PRESIDENT.—I beg to thank you for the kind way in which you have received my effort this morning. Mr. Alderman Flint has specially referred to the last paragraph but one in the address. May I say that I felt that we, as tramway chairmen, as delegates, and as managers, could not meet this morning without making some reference to the brave fellows who left everything and gave up their lives for their country and those dear to us. I am very glad you have appreciated that point, and I am sure we do earnestly give our condolences to the friends of those who have fallen. (Applause.)

The President then called upon Mr. J. M. McElroy to read the paper which he had prepared and had entitled:

SOME NOTES ON PASSENGER TRANSPORTATION IN LARGE CITIES.

BY MR. J. M. MCELROY
(*General Manager, Manchester Corporation Tramways*).

Systematic studies of the passenger transportation requirements of the large cities in this country—studies directed towards making proper provision for meeting the constantly-increasing traffic demands which follow the cities' development—have not in the past been undertaken with that thoroughness which has been characteristic of many cities abroad, particularly in America. Looking ahead is not one of our strong points, and certainly preparation for future developments has not been a distinguishing feature in some phases of our local government. True it is that in recent years we have heard much of town planning, but it is doubtful even now whether it is being conceived and directed, except perhaps in a few instances, with that breadth of view which its importance demands.

Town planning schemes and the making of provision for future passenger transportation requirements are really part and parcel of the same problem, and should be considered together. They cannot be divorced if the best results are to follow; and the planning of transit facilities should only be undertaken after detailed studies have been made of each city's traffic characteristics. That our ancestors gave little or no attention to town-planning the older parts of most of our cities only too plainly indicate. The lay-out of the streets followed no plan—they "just happened." In consequence of this the difficulties in the way of providing adequate transit facilities sooner or later becomes one of the most complex questions we have to face.

As cities grow, due to the gradual increase in population, and as the riding habits of the people develop, it becomes more and more difficult to make the channels of passenger transport equal to the ever-growing demands. In every city the main factors affecting this problem are much the same. There is a constant migration of the population from the inner to the outer zones, and this is greatly accelerated by every extension and improvement in the means of transit. Suburban districts rapidly become urban, and new suburban districts in the outlying areas are always in process of formation. Smaller towns and districts on the outskirts are drawn into closer touch with the cities, and a greater community of interests is being established over a gradually-widening area.

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Every extension of the means of transit into the outer zones adds to the difficulties of handling the traffic in the central zone, and in time the congestion becomes so acute that the city authorities realise that they are face to face with the inevitable traffic problem. This condition of things arises sooner or later in all large cities, but some cities have been confronted with the problem at an earlier date than others owing to the narrowness and bad lay-out of the streets in the older parts of the city, to the absence of suitable arterial roads, and to the presence in the central zones of a large amount of ordinary vehicular traffic which, if it is slow-moving, tends greatly to retard the general flow of traffic.

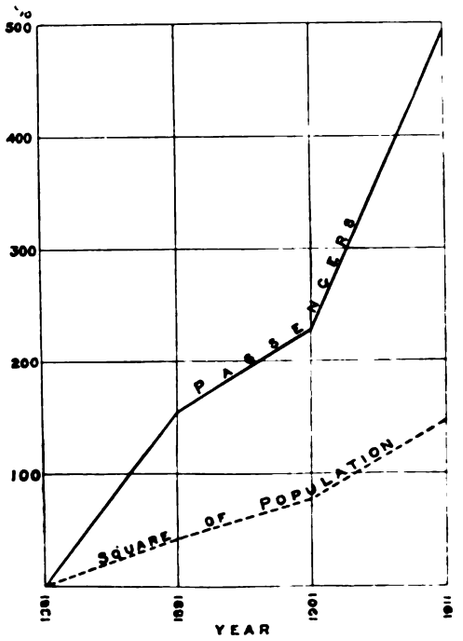

Diagram No. 1.
Showing Percentage Increase of (1) Passengers Carried, (2) Square of Population in Manchester and District.

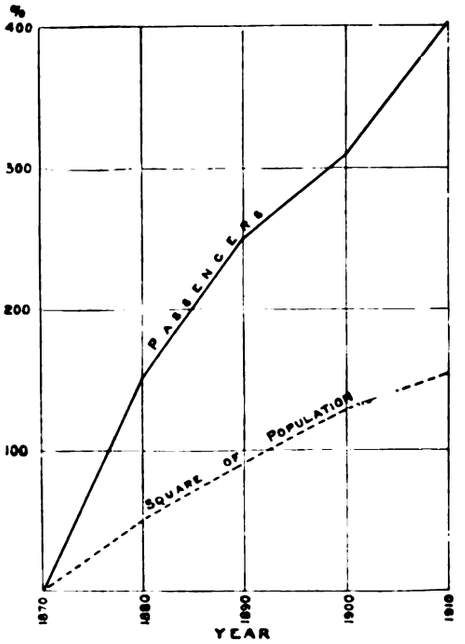

Diagram No. 2.
Showing Percentage Increase of (1) Passengers Carried, (2) Square of Population in Greater London.

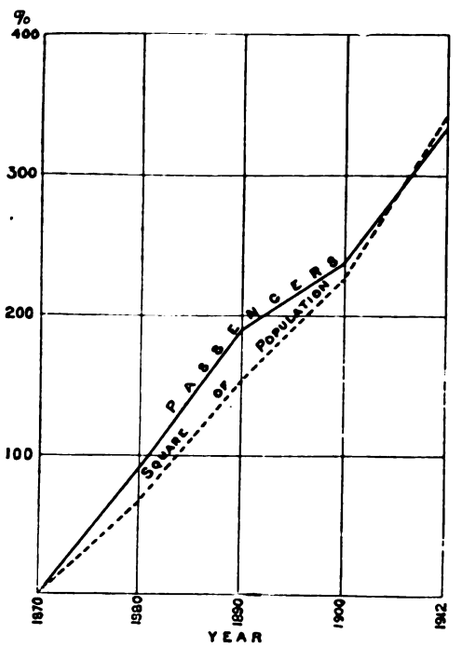

Diagram No. 3.
Showing Percentage Increase of (1) Passengers Carried, (2) Square of Population in Greater New York.

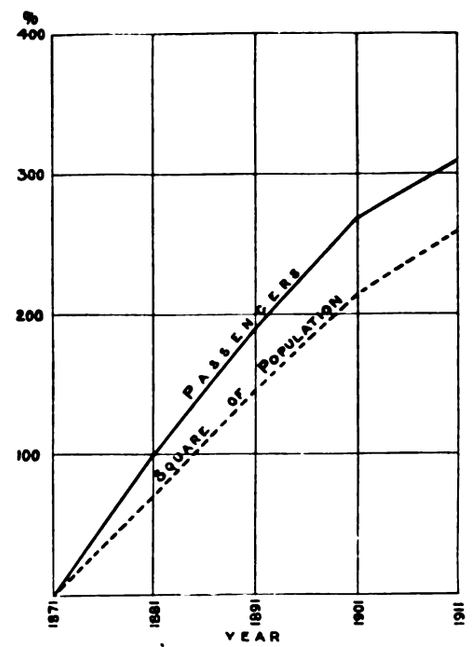

Diagram No. 4.
Showing Percentage Increase of (1) Passengers Carried, (2) Square of Population in Boston.

It is well known that the passenger traffic in cities grows at a much greater rate than the increase in the population. Some years ago a student of traffic questions, having analysed the statistics of a number of European cities, found that on the average the number of passengers carried increases in the same ratio as the square of the population. This rule is approximately true as regards American cities, but it does not appear to be true as regards British cities. In some of our cities the number of passengers carried is increasing at a much greater rate than the square of the population.

The accompanying diagram, No. 1, shows the percentage increase of (1) the passengers carried, and (2) the square of the population in Manchester and the surrounding districts during the past three decades. Diagram No. 2 shows similar information as regards Greater London. In both of these instances it will be seen that the number of passengers carried is increasing at a much greater rate than the square of the population. Diagrams Nos. 3 and 4 show the facts as regards Greater New York and Boston, from which it will be observed that the line indicating the passengers carried very closely follows the line indicating the square of the population.

In considering the traffic statistics of various cities, it may be very misleading to draw general inferences unless the local circumstances in each case are fully recognised and clearly kept in mind. Many factors tend to accelerate the normal growth in a particular city, and unless we are acquainted with these we may be drawing wrong conclusions from the data. Quite apart from the question of the increased facilities and the introduction of general improvements in the means of transit—which are always followed by a rapid rise in the number of passengers carried—the factor as to the fares charged, and the changes made therein from time to time, has a most important bearing on the subject. We have therefore in the case of each city not only to look at the total transit facilities

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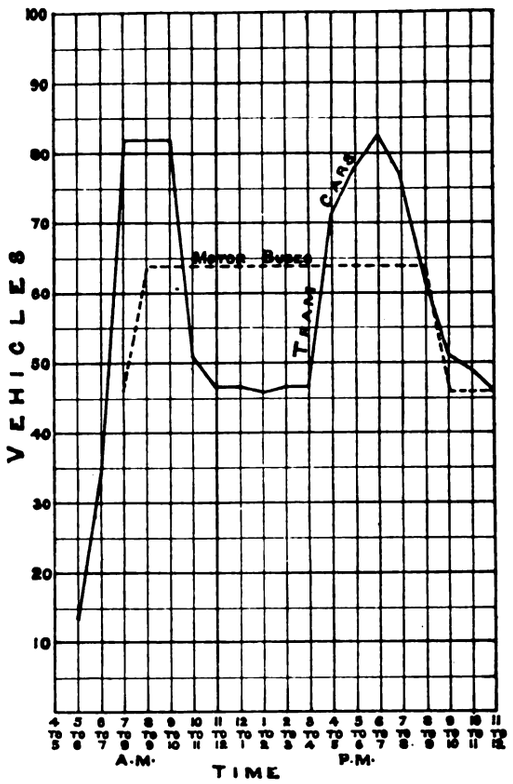

Diagram No. 5.
Showing Number of Tramcars and Motor Omnibuses passing in one direction along Walworth Road, London, July, 1914.

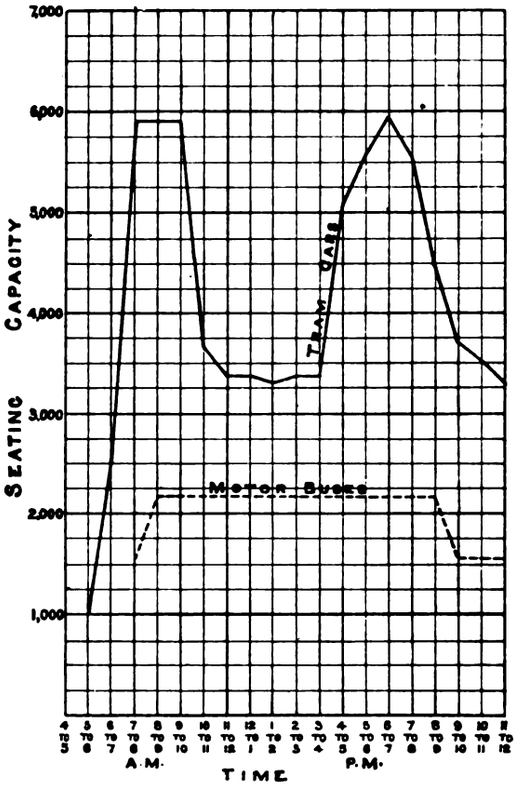

Diagram No. 6.
Showing Seating Capacity on Tramcars and Motor Omnibuses passing in one direction along Walworth Road, London, July, 1914.

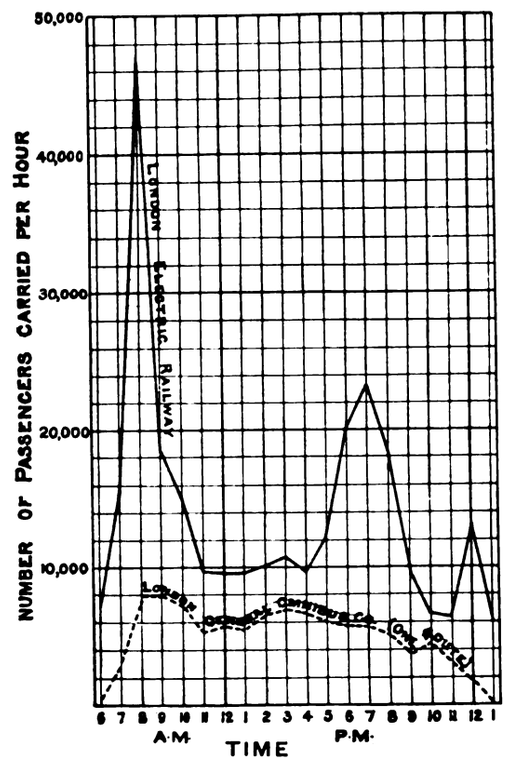

Diagram No. 7.
Showing Hourly Number of Passengers carried on the London Electric Railway and one route of the London General Omnibus Company.

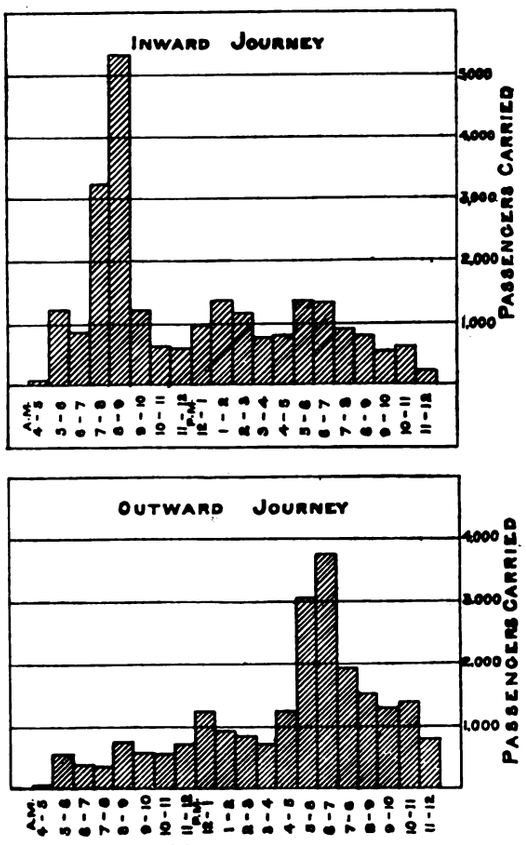

Diagram No. 8.
Showing the Number of Passengers carried each Hour of a Typical Day, Rochdale Road Route, Manchester.

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provided, and gauge their excellence or otherwise, but we have to look at the fares charged, and see the effect of these. We should ascertain the extent to which long-distance and short-distance passengers are respectively catered for. In short, comparative statements as to the number of passengers carried tend to be misleading because they do not indicate the average distance travelled by each passenger.

The ultimate volume of passenger traffic which can be dealt with by facilities which use the street surface is limited by the capacity of the arterial routes near the central parts of the city. When the traffic on these routes approaches the saturation point, then additional arteries must be opened out or other transit facilities provided.

The new facilities which may be provided are :—

(1) Railways—(*a*) in shallow subways; (*b*) in deep level "tubes"; (*c*) on elevated structures.

(2) Shallow subways in the congested areas into which the surface cars can be run.

Many cities have not waited until the saturation point of the surface facilities has been reached before underground or overhead railways have been constructed, because the demand for the railways has arisen through the constant desire for quicker movement. In other words, *time saving* has been the main factor which has led to the construction of many city railways, and the patronage they receive from the public depends largely upon the time-saving capabilities of the lines.

Experience shows that the provision of shallow subways into which surface cars can be run so as to relieve the traffic congestion in the central parts of cities cannot be justified owing to the great cost of construction and the comparatively small amount of traffic which can be passed through them. Underground lines of any description can only be justified by a dense traffic demanding the operation of high-speed trains run at very close intervals.

In planning new transit facilities a wide outlook is all-important. Any schemes carried out on narrow or confined lines, or which do not form part of the transportation requirements of the city viewed as a whole, ultimately result in serious losses to the community from every point of view.

Underground lines should be so laid out that they can be worked in conjunction with the surface lines by providing suitable transfer points from surface to underground and *vice versa*. The surface lines should gather the local traffic and feed the underground lines, which, in order that they may pay their way, must be provided with an immense volume of traffic. It is not at all likely, having regard to the general experience, that private enterprise will be willing in future to shoulder the great outlay involved in the provision of underground facilities.

The accompanying statement shows the immense sums invested in urban railway lines in a number of cities, and the proposed further expenditure which some of such cities are proposing to incur. In New York the total outlay on the underground and elevated lines—when the extensions are fully completed—will be £137,000,000. The expenditure on the extensions, undertaken in recent years, will be £68,000,000. This capital is being provided roughly half and half by the city and by the operating companies. The companies are to get out of the revenue all their operating expenses and 6 per cent. upon their investments, and out of the balance the city is to get the interest on its investment plus 1 per cent. for sinking fund, and if there is any profit after these payments have been made it is to be divided equally between the city and the companies. It is, however, doubtful whether there will be the available net revenue to meet the interest and sinking fund payments of the city, and the possibility of any ultimate profits to the city is remote. But the city authorities are not looking for profits. They are determined to provide adequate travelling facilities—and so important a duty on the part of the municipality do they consider this that they have made up their minds to do it properly, even if it entails a charge upon the rates of the city.

In London—where all the capital for the underground railways has been found by private enterprise—it is pointed out by Sir Albert Stanley that in 1913 the amount available for dividends on the ordinary capital was only sufficient to pay just over 2 per cent.—not a very encouraging result for a city which has the largest population in the world.

In studying the problem which we are now faced with in Manchester—where several of our arterial routes approaching the centre of the city have practically reached the saturation point—I came to the conclusion, after careful consideration, that the proper course for the Corporation to pursue to meet the constantly-growing requirements was—before attempting to provide underground facilities, the cost of which is so enormous—to improve and make more efficient the existing surface lines by opening out parallel routes, by forming new streets and widening others at considerable cost, and also by adopting tramway terminals near the heart of the city, the latter being necessary on account of the narrowness and bad lay-out of the central streets.

Since my report was written I observe that Mr. M. C. Brush, the vice-president of the Boston Elevated Railway Company—a company which operates the whole of the transportation facilities in Boston, i.e., the surface tramways, tramways in subways, underground and elevated railways—made the following observations in a paper read before the American Electric Railway Association in 1916 :—

> "When tracks in a certain street have reached the saturation point . . . . and additional transportation facilities must be provided, every conceivable effort should be made to use parallel streets for additional surface tracks, or even build an elevated structure. It is absolute economic waste to recklessly spend enormous sums of money for subway construction merely because a particular highway has operating upon it all the surface cars consistent with either good transportation or economy, and subway construction should only be decided upon after other and less expensive means of furnishing additional transportation have been sufficiently studied to justify their expediency.

STATEMENT SHOWING CAPITAL INVESTED IN UNDERGROUND AND ELEVATED CITY RAILWAYS.

	Greater New York.	Chicago.	Philadelphia	Boston.	London.
Total Amount at present Invested :—	£	£	£	£	£
(A) By the Company :—					
Elevated lines ...	33,541,667	20,416,667	...	...	...
Underground lines ...	23,958,333	...	...	...	53,962,628
	57,500,000	20,416,667	3,541,667	7,291,667	53,962,628
(B) By the City :—					
Elevated lines ...	2,083,333	...	...	...	...
Underground lines ...	9,375,000	...	...	...	...
	11,458,333	...	...	1,875,000	...
Total amount at present invested ...	68,958,333	20,416,667	3,541,667	9,166,667	53,962,628
Proposed Futurr Expenditure :—					
(A) By the Company :—					
Elevated lines ...	13,958,333	...	3,333,333	1,250,000	...
Underground lines ...	20,833,334	7,291,667	1,458,334	416,667	...
	34,791,667	7,291,667	4,791,667	1,666,667	...
(B) By the City :—					
Elevated lines ...	4,375,000	...	833,333	...	...
Underground lines ...	29,583,333	20,000,000	6,458,334	1,458,333	...
	33,958,333	20,000,000	7,291,667	1,458,333	...
Total Proposed Future Expenditure ...	68,750,000	27,291,667	12,083,334	3,125,000	...
Average cost per route mile of existing lines ...	564,313	372,563	485,167	684,063	(*) 664,230

(*) This figure is the average of four companies, viz. :—Central London, City and South London, Great Northern and City, and London Electric.
A large part of the works in New York included under the head of "Future Expenditure" has been carried out since this table was compiled in February, 1914.

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> "The enormous amount of traffic absolutely necessary to support expensive subway construction makes it incumbent on those responsible for such expenditure to thoroughly satisfy themselves that the traffic offered, and the conditions prevailing, compel subway construction rather than the use of other arteries on the highway or even private right of way construction on the surface."

The necessity of utilising the streets to the fullest advantage for meeting the demands for passenger transportation involves the consideration, from time to time, of the question as to the most suitable means of surface transit, having regard to the traffic requirements.

Much has been written about the relative merits of tramcars and motor omnibuses—unfortunately not without bias on the part of the advocates of each class of vehicle. An abstract discussion as to the relative merits of tramcars and motor 'buses, without reference to the particular purpose for which they are intended to be used, is likely to be very misleading. Each type of vehicle has its peculiar advantages, and in the future each will be utilised for handling that class of traffic for which it is best suited. The tramcar, on account of its greater seating capacity and its ability to cope with traffic of a widely fluctuating character, will be utilised where heavy peak loads have to be catered for. On the other hand, where the volume of traffic is not great, or where there is a steady traffic flow throughout the day, motor 'buses will probably prove to be the more suitable vehicles. In some instances it may be found to be advantageous to run the two types of vehicle along the same routes. The aim should be to use the highways as channels for passenger transport to the best possible advantage, and the most efficient means of doing this can only be decided upon in any particular case by a study of the traffic characteristics.

Attempts have been made to show the relative efficiency of the two types of vehicles—tramcars and motor 'buses—by comparing the *average* loading. It has been pointed out that "the average load of a tramcar with 74 seats is 10½ passengers, and of the motor 'bus with 34 seats is 8 passengers, and therefore the relative efficiency of the motor 'bus is almost twice as great as that of the tramcar." This is a distortion of the meaning of the word "efficiency." In practice we have not to deal with hypothetical averages, but with actual traffic conditions—conditions often varying greatly at different times of the day. The relative efficiency of the two types of vehicle cannot otherwise be gauged than by their ability to cope with the volume and flow of traffic in particular cases.

Diagram No. 9 shows the loading of a typical tramcar during a full day's continuous running on the Palatine Road route, Manchester. The car has a seating capacity for 75 passengers. The intermittent nature of the loading, and the effectiveness of the tramcar in handling it, are clearly indicated. The diagram also shows by a broken line the seating capacity of a motor 'bus. The tramcars on this route have the upper saloons covered, and therefore the whole of the seating accommodation is available in all conditions of weather. In bad weather the outer seats of motor 'buses are nearly always empty, hence their effective seating capacity under these conditions may be said to be reduced by about one-half. The *average* number of passengers carried per car-mile on the tramcar shown on the diagram was 14. The fallacy of using this figure as a measure of the car's efficiency is too obvious to need comment.

Diagrams Nos. 5 and 6 (kindly prepared for me by Mr. A. L. C. Fell) show what the tramcars and motor 'buses are doing respectively to meet the traffic demands on a typical route in London. Diagram No. 5 shows that the number of tramcars passing in one direction at the hours of peak load is 82. At the slack hours nearly half the cars are withdrawn. On the other hand, the motor 'buses make no attempt to deal with the peak between 7 and 8 a.m., but obviously cater for a steady all-day traffic. Diagram No. 6 shows the relative seating capacity of the tramcars and motor 'buses referred to in Diagram No. 5, and illustrates the effectiveness of the former. The trams are dealing with the peak loads and the 'buses are catering for the steady pick-up traffic throughout the day.

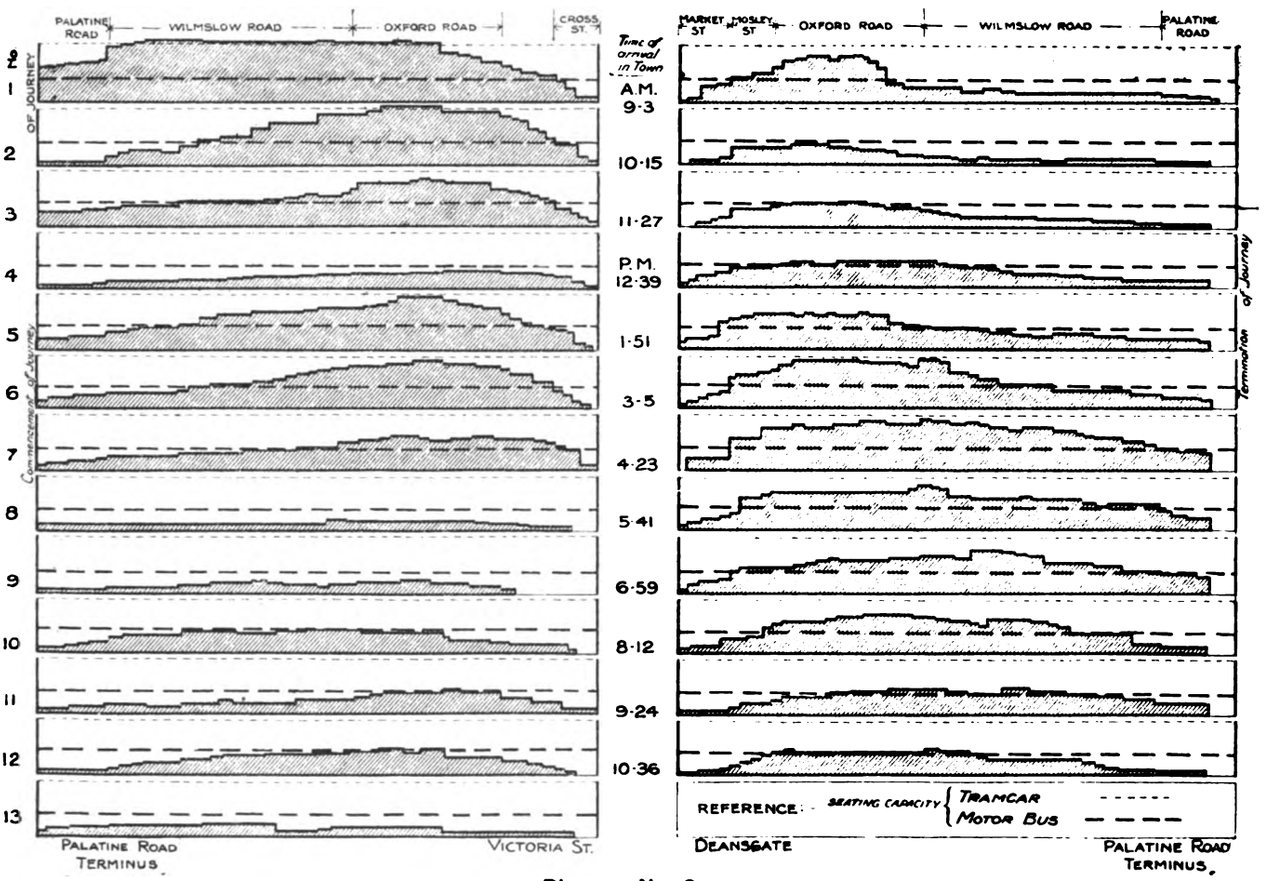

Diagram No. 9.

Showing Loading of a Typical Car during a Full Day's Continuous Running on Palatine Road Route, Manchester

Diagram No. 7 (taken by permission of Sir Albert Stanley from his paper on "London Traffic") shows the fluctuating character of the loading on the London Electric Railway and on one route of the London General Omnibus Company. Here is an illustration of the ability of the railways to handle heavy peak loads and the lack of capacity in the case of the motor 'buses.

Sir Albert Stanley in his paper points out that—

> "*The motor 'bus, when operating in conjunction with other means of transit, has not a peak load.* One reason is the absence of workmen's return fare, which cuts it off from a fair share in the traffic before 8 o'clock in the morning. Another reason is the smallness of the units required to be filled with traffic, which allows of a closer adjustment to demands. A third reason is the special feature of motor 'bus traffic casually picked up all day long, so long as there is traffic in the street. The motor 'buses are always reasonably full throughout the day. *At the time of peak load they are quite full.*"

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The opening sentence and the last sentence of this quotation put the facts very frankly—at the rush hours the motor 'buses are quite full, but the other transit facilities are looking after the peak loads.

Diagram No. 8 shows the number of passengers carried each hour of a typical day on the Rochdale Road route, Manchester. The heavy peak loads are carried mainly by large tramcars with a seating capacity of about 75, which are taken out of service immediately the rush hour is past. The difficulties that would be encountered if we had to handle these loads by means of small traffic units are too obvious to need detailing.

The making of proper provision for handling the rush-hour traffic will always be the difficult part of the passenger transportation problem. It involves, and will continue increasingly to involve, a large expenditure of capital and comparatively high operating costs. It is on account of this that competition by separate companies for the steady all-day traffic by means of vehicles which can be run on the public streets at a relatively small capital cost, and which escape many of the obligations placed upon those who cater for the peak loads, is unfair, and should not be permitted.

The right to operate public service vehicles, acquired by merely obtaining an annual license, is archaic, and new legislation dealing with this matter is urgently needed. Concessions to use the public streets, if granted, should carry with them obligations in the public interest, with corresponding security and protection for the operators.

It is becoming more and more clearly recognised, by all those who are qualified to judge, that the public interests are best served by making the facilities for city passenger transportation a monopoly—a monopoly subject to the control of the city authorities, who should possess full powers either to provide and operate the facilities themselves, or, if they think fit, to grant franchises to private companies to do so, subject to control and regulation in the public interest.

The world's experience has shown that every city should have a permanent authority directing the initiation and carrying out of all schemes for new transit facilities, in order that there may be continuity of policy, and that the future needs of the city and the surrounding districts over a wide area may be properly looked after.

THE DISCUSSION.

Mr. H. H. GORDON (deputy chairman, London County Council).—Mr. President and gentlemen. It was my good fortune about two and a half years ago, just before the war, to be following Mr. McElroy's footsteps—I am not at all sure whether in some instances he was not following mine—in visiting the larger cities on the Continent with a view to investigating the traffic conditions which prevailed there, and with a view to picking up, perhaps, a useful hint which might help us in our work as people interested in the traffic organisations of large cities. I found there many things which gave me good cause for satisfaction when I compared home and foreign conditions. (Hear, hear.) I also found many things where apparently we did not show to such advantage. You, Mr. President, have alluded to the fact that the policy of Germany has always been one of "Thorough," and I regretted to find that among all the large cities which I visited—I visited something over a dozen—I found that Berlin was supreme in the number of journeys per head of population. The number of journeys per head of population in Berlin in 1913 was 312; and in London it was 238. London only came seventh in the point of enumeration of the travelling habit of the citizens of great cities. Manchester had in that year 201 journeys per head of population. The main difference between the travelling habits of large cities I have found to be attributable to the fact that in none of the cities, or in very few of the cities of Great Britain, did we have so extensive a tramway development as is characteristic of the great cities on the Continent. In the city of Milan, for example, there were 207 journeys per head of population by tramways alone. In Berlin there were 190. In London there were 113. In Milan there were 20 miles of tramway for every 100,000 of population. In London there were four miles of tramway for every 100,000 of population. The result of that is seen in the fact that the travelling habit on the whole in the cities of Great Britain is not so well developed as is the travelling habit on the Continent.

Now, Sir, I know that attempts have been made at various times to associate the number of journeys made per head of population in any city with the population of that city. I think that is an entire fallacy. (Hear, hear.) I have tried to plot out on diagrams and to find equations to show some relationship between population and journeys in the cases of twelve of the large cities of our country. I can find no casual connection between them when I considered the mere number of population, or even when I considered the square, or any higher factor, of population. In fact, that the number of journeys and the population of a city are not directly connected is clearly proved by some interesting investigations which were made in America by one of those distinguished traffic experts to whom Mr. McElroy has referred—Mr. Bryan J. Arnold. He pointed out that in Chicago at a certain period there was an increasing population; there were increasing facilities for traffic; but a decreased number of journeys on the part of the population, due to an adverse trade condition. In trying to estimate the number of journeys for which we must cater it is no good relying merely on population. You have to take account of facilities; you have to take account of the nature of the trade carried on there; and you have to take account of the social conditions of the people; and any attempt to establish such casual relationship based on one factor only will, in my opinion, be bound to lead to inconclusive results.

I have been very much interested in the suggestions Mr. McElroy has put forward as to how we are to deal with the intense traffic problem in the centres of all our great cities; and I notice it has been suggested that we may hope to alleviate the congestion in the centres of our great cities to some extent, at all events, by the construction of underground or overhead railways, or shallow subways. I have been led to the conclusion, as the result of such investigation as I have been able to make, that we cannot hope to relieve the congestion in the centres of our cities by any means of railways—underground, overhead, shallow subways, or any other way; and the experience of the whole of the Continent and the experience of the whole of America, confirms that idea. Members of this association probably know the famous Rue de Rivoli in Paris. It was always the great shopping centre. The traffic was immense. It was proposed to construct a branch of the Metropolitaine—the underground electric railway of Paris—immediately underneath this street. Shopkeepers went horrified to the Minister of Public Works and said, "We shall be ruined; everybody will go underground; the famous arcades will be deserted; and our trade and businesses will be lost." The Minister of Public Works did not listen to them. The lines were constructed. But there were not fewer pedestrians on the surface. Then motor omnibuses were installed to carry the passengers through the streets in the place of the horse omnibuses. Again, there was no diminution in the number of pedestrians in the street. Then the Metropolitan railway had another line put underneath it; but still the Rue de Rivoli is more crowded and there are more foot-passengers in the street than ever in its previous history.

The same is the case in London. Take the Central London Railway. There are more motor omnibuses, with greater carrying capacity, running through Oxford Street now than at any time in its previous history. And I was very much interested when in Buda-Pesth to see that the first shallow electric railway in Europe, which ran under the Andrassy Út, along the most crowded and fashionable thoroughfare in Buda-Pesth, had not succeeded in 1913 in banishing the gaudy-coloured box-like vehicle which they called an omnibus. And experience in America has proved that you cannot banish the congestion in the central streets by the construction of underground electric railways. Nor, on the whole, ought we to be too alarmed at the congestion which prevails in the central streets because to a large extent the amount of traffic which goes through the centre of towns is an index of the prosperity of the town, and the more crowded our streets are, I hope they will become yet more and more crowded and that the trade and the prosperity of the cities in which we live may become greater and greater. That is true. But there is a well-regulated crowd, and an ill-regulated crowd; and what takes place now mainly in our cities is not a well-regulated crowd but an ill-regulated crowd. And I agree with Mr. McElroy in thinking that we who are interested in tramways should devote ourselves more to the consideration—and a better consideration—of the laws which apply to the regulation of traffic in streets; not merely the regulation of our tramway passenger traffic, but to the regulation of all traffic and all vehicles.

I have made some calculations—I am investigating the subject on my own account—and I find that with all our crowded streets we are not usefully occupying more than one-third of the available carriage-way if traffic were properly regulated in accordance with proper traffic rules. And that brings me directly to another consideration in connection with the relative merits of motor omnibuses and of tramways. Granted that the streets in the centre of our great cities are of such great value that it is of primary importance that we should make the utmost use of them; we ought to see that we employ such instruments of traffic as enable us to make the most efficient use of the streets. (Hear, hear.) I put that down as almost a truism. Regarded merely as a vehicle, everybody in this room knows that per passenger carried a tramway occupies less street space than does a passenger carried by a motor omnibus. That is not all We are told that on account of the inflexibility of tramcars, tramcars become a hindrance to transit and thereby restrict the even flow of traffic; whereas the flexibility of the motor omnibus enables them to utilise every portion of the street space and thereby makes greater use of the carriage-way. No greater fallacy was ever uttered. It is an absurdity to imagine that the proper regulation of traffic is for the traffic to go in and out, this way and that way, all over the road; sometimes two or three vehicles abreast and sometimes one impeding the other—that is not the way traffic ought to run; that is not the way in which traffic should be regulated. In the case of the most efficient transit we have—I mean the railways—the proper flow of traffic is on straight lines and at regulated speed; and if you consider the proper regulation of street traffic from that point of view, you will abolish the flexibility of the motor omnibus and you will come more and more to that rigid system of even flow of traffic on straight lines, with uniform intervals between, more in accordance with the lines our

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tramways follow, and not in accordance with the lines the motor omnibuses follow. Therefore I say it is particularly important that we who are interested in tramway matters should devote ourselves to the consideration of the laws of traffic as applied not merely to our own vehicles but also as applied to all other instruments of traffic which use the road. And we who are interested in tramways have also to see that such an abomination as widening streets at enormous cost and then allowing any individual to occupy it for standing vehicles while loading goods should be abolished together with other traffic abominations. I must say that here again in Berlin I found that the traffic regulations from that point of view were very much better than they are in any town in this country, and they would not allow any big individual premises to be built abutting on a main thoroughfare unless a wharf were established whereby the goods could be received by the firm.

One other point and I am done. I say I am a tramway man, and that does not say that I have any bias against motor omnibuses or railways; on the contrary we have to recognise that we are all interested in the solution of the transit problem; that all these extensions of transit to which I have referred are equally essential to the solution of the problem. I was rather astonished to find that Mr. McElroy said that where a load is constant throughout the day that there the motor omnibus was an efficient instrument of transit. I should have imagined that with a constant load no tramway manager would have desired anything better than the opportunity of running tramways along such streets.

Now the determining factor is this, as Mr. McElroy has rightly pointed out:—the variation in the amount of traffic and the question of peak loads. We tramway men complain that we have to do a very large share of the peak load whereas the motor omnibus is entirely devoid of any such work. We have every reason to be grateful when we compare the diversity of traffic on tramways with the diversity of traffic on, say, the Great Eastern Railway in London. In the busiest hour in the morning the Great Eastern Railway brings in 16 times as many passengers as it brings in in the least busy hour of traffic. In the London County Council Tramways we have only to deal with a diversity of eight to one. The Great Eastern have to deal with a diversity of sixteen to one; and that at once shows that it would be impossible to hope to carry the Great Eastern Railway traffic by means of tramcars.

As Mr. McElroy rightly pointed out, the limiting factor in traffic organisation is the capacity of your internal area. Just fancy, if in addition to the numerous tramcars which already run, say, from Bow to Aldgate, we had to carry the enormous Great Eastern Railway traffic, which railway runs parallel to that route, and which carries three or four times as many passengers as we do. The streets could not accommodate the traffic. For times of intense peak loads there is no instrument of transit so efficient, in my opinion, as a railway, whether it be a tube railway, or a high-level railway, but, of course, there must be an enormously high peak load. You cannot hope economically to carry these high peak loads unless you have some such organisation as a railway. On the other hand, for moderate peak loads—eight to one—I think there is no instrument of traffic so efficient as a tramcar; and for places where the traffic is intermittent and not heavy at all, where it varies from day to day—pleasant Sunday afternoon excursions (laughter)—there is no instrument of transit so efficient as a motor omnibus. It is all a question of the degree of the intensity, and the regularity of the traffic with which you have to deal, as to which instrument of transit you employ. I think tramway men would be only too glad to have the opportunity of handling the varying traffic which the London General Omnibus Company enjoys, say, down a street like Oxford Street—

A DELEGATE.—Or Bayswater Road.

Mr. GORDON.—Yes; or Bayswater Road. Now let us recognise, as Mr. McElroy recognised it, that to deal with high peak loads means an enormous expense. To deal with a high peak load by railways and giving them no other traffic during the rest of the day is a proposition which cannot be commended on financial lines. The dividends of the London tube railways show what the result is. The railway serving the richest traffic area in central London pays a beggarly 2½ per cent.; no wonder there is no desire to extend tube railways in London. But here we come to the crux of the whole situation. London has given a valuable lesson as to the direction in which we are to develop. Mr. Blain's company, the London Traffic Combine, has shown it. Mr. Blain's interest at the present time is motor omnibus operation. Motor omnibus profits are paying the dividends of the London United Electric Railways. In London you have combined two of the main instruments of transit. You have combined the tube railways, with their tremendously high capital cost and low cost of operation, with the omnibus company which has a low capital cost and a very large number of passengers; and it is the combination of the two which enables both to pay dividends. Now we want to extend that. We want to extend the combine of the tube railways and the omnibuses to the absorption of the London County Council Tramways in order that we may have what is essential in every city, as Mr. McElroy has pointed out, a unified control of all the instruments of transit, utilising each to the best advantage—(Mr. McElroy.—Hear, hear.)—and utilising the instruments of transit in the way they should be employed.

The last point is that to my mind traffic is so important; the whole of our civilisation, the whole of our social amenities, depend upon it, that I think that the authority controlling the forms of transit in all large cities should be a public authority whose object shall be not to cater for dividends but the conserving of the best interests of the community. (Applause.)

Mr. H. BARROW (chairman, Birmingham Tramways Committee).—Most of the delegates here will remember a paper read by Mr. Baker some years ago in reference to town planning and tramways. He stated at that time that we were hoping in Birmingham to get some wide roads made with tramways put upon separate tracks; but I am sorry to say that up to the present we have not got those roads made. Liverpool has been ahead of us and has succeeded in getting some made. But I rise to-day to emphasise the importance of the point made by Mr. McElroy of the tramway department working in with the town planning department. Although we have no roads actually constructed in Birmingham, as I have just said, we have two schemes for town planning, therefore we have been one of the earliest authorities to get complete schemes agreed to by Parliament. In connection with those two schemes we have wide roads laid down for tramway purposes, in two cases 100 ft. in width, which will admit of a separate track for the tramway. We are preparing three other schemes of town planning at the present time, and in connection with those schemes we are preparing for roads 120 ft. in width for the purpose of tramways. There is no necessity, of course, on these roads which are laid down to spend any money at the present moment; all that is required is to see that you have the space left in the roads for future purposes. That is an important thing to remember. There is an idea abroad that enormous sums of money are going to be spent on these streets at once. That is not so. All you want is your road planned; the part constructed may be only 20 ft. wide at the present time; but you have looked ahead and you have realised that this will be one of the main arteries out of the town in the future, and, therefore, you are securing your space of 100 to 120 ft. in width.

Mr. McElroy also emphasised the necessity of the tramway department and the town planning department working together. That is what we are striving to do in Birmingham; and the two departments always consult together—the tramway department consults with the town planning department before it considers the putting down of a tramway; and the town planning department always comes to us with its schemes for the future and says, "Will you be likely to run tramways down this or that particular road?" I want to emphasise this because I am certain it is essential that those two departments should run and work harmoniously together and look to the future. We are always saying it is too late to have town planning now; but we forget that every year in ordinary times thousands of houses are put up, and many miles of streets are made; and that in a few years our suburbs which are now absolutely country will be filled up with houses. We heard from Mr. Long yesterday that there is a suggestion of spending £20,000,000 in building houses. There you get a glimpse of what is going to happen after the war is over.

I have been very much interested in that part of Mr. McElroy's paper dealing with the central parts of the big cities. I think that Birmingham, perhaps, is peculiarly unfortunate in the manner in which it has been laid out—or, has not been laid out—and we have had the greatest difficulty in dealing with traffic in the centre of Birmingham. The town planning department has appointed a committee to deal with the problem, and it is working with the tramway department. It has been suggested that we might construct subways, but the facts and figures that have been given point to the fact that that is not going to be the solution of the difficulty. I think we are much indebted to Mr. McElroy for the information he has given us on this subject. (Hear, hear.)

Alderman H. B. VARWELL (chairman, Exeter Corporation Tramways).—I do not know whether there are any gentlemen here who have to do with old cities with narrow thoroughfares, who can tell me whether there are any regulations as to motor cars stopping at shops for a length of time to enable people to do their shopping—if they are allowed to stay at all, or not.

Alderman F. SMITH (vice-chairman, Liverpool Corporation Tramways).—The very excellent speech that has been delivered by Mr. Gordon supporting the paper on which Mr. McElroy has spent so much time with such excellent results, prompts me in response to your kind invitation to say a few words. However much we admire German thoroughness—and I, in 1897 looking at their systems admired some portions very much—it became perfectly clear to me by the development of Liverpool, that we could very considerably improve on several points. (Hear, hear.) In the year of which I am speaking there was strong competition between Sir Arthur Forwood and some of us with regard to the view we took of American and German organisation and working of tramways. I had not the good fortune in 1897 to see America; but in 1898 I saw both America and Canada. The working of the German one-deck car system seemed to me at first to be the most admirable of systems; but in the early development in Liverpool it was found that the one-deck car with trailer was not suitable to our streets and to our working; and that we could shift a greater number of passengers with less risk and greater speed by a double deck car than by either

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the American or the German type of car, as we tried both types of car, the trial of these types being arrived at on a division only decided by a majority of one—Sir Charles Petrie on that division giving the one deciding vote.

I was very much struck by some of the observations made by Mr. Gordon, and I cannot but think that the bounden duty of every gentleman who has read Mr. McElroy's excellent paper is to offer some observations upon it, though I have said over and over again at these useful meetings—and I say it again this morning—it is an astounding thing that a body of intelligence such as we have at this conference should permit a call upon Mr. McElroy to actually read a paper that has been in our hands for ten days, which every man managing tramways ought to have read carefully, so as not to be called upon here on the spur of the moment—which is a very bad spur to speak upon—to offer observations on it. We are entitled to expect from every tramway manager present the considered expression of thought on the contents of a paper of such great importance. Mr. McElroy has given us diagrams which I think are of real value. I can assure this conference that consideration will be given to them in Liverpool. A very great deal can be done and must be done to meet the changing conditions, bearing in mind the enormous increase in our traffic. We must make new arrangements; and I am driven by my observations to agree with what I think is the idea of Mr. McElroy that the future of the development of tramways lies upon the street, by parallel, or broader, roads. Our friend from Birmingham says that we must work hand in hand with the Town Planning Department. Directly he starts to do this he will find that the city engineer will—like the city engineer of Liverpool, who is a very wide-awake gentleman—dip his hand in the tramway pocket for some portion of the cost of widening the roads needed by town planning. (Laughter.) Within limits I do not see very much objection to that. Thought and care must be given to the user of your tramway profits, and if those tramway profits are not secured and wisely dealt with while you can do so, the development will not be attained that you really want in the great interests of moving the travelling public. We must move them quickly; we must move them safely; and to do that we must have wide roads.

Many of the points in the very able speech of Mr. Gordon have made an appeal to me, such as his proposal of one traffic authority, and that traffic authority to take special heed of the more or less uneducated, I am bound to say that in spite of the Education Act which has been working for 40 to 50 years—we still have samples in Liverpool of the uneducated carter who, smiling at the tramcar, runs carefully in front of it, jeering at the driver who seeks to get on with the job he has in hand. I am very much indebted to Mr. McElroy for many points contained in his paper, and I feel especially indebted to Mr. Gordon, who has given us such an illuminating address upon it. (Hear, hear.)

Mr. H. W. Wale (vice-chairman, Coventry Tramways Committee).—I feel particularly interested in the paper that has been given by Mr. McElroy because I happen to come from a town whose population has increased by 50 per cent. in a decade. Now, in the concluding part of his paper Mr. McElroy says this: "The world's experience has shown that every city should have a permanent authority directing the initiation and carrying out of all schemes for new transit facilities, in order that there may be continuity of policy . . ." I want to know what that means, because we had an unfortunate experience in Coventry when we were inaugurating a motor omnibus system. In instituting that we had to get the consent of Parliament, and what happened was that while we were very desirous of being the permanent authority every other authority affected in that particular neighbourhood looked upon us as aggressors and promptly appealed to Parliament to scotch the scheme we put forward. I say this most unhesitatingly that unless Parliament expressly confers, not on a city but on a district, a transport authority for that district, we shall not get on very much. Otherwise what would happen would be that the railway authorities touching the city and district would feel that their interests were affected; the particular motor omnibus companies operating in that area would also feel that their interests were affected; and instead of getting a policy or continuity of policy as a paramount consideration, or getting something which would be of value to the community, you would have a proposition not worthy of serious consideration. I would ask Mr. McElroy to deal with that point because it is of particular interest to communities such as that from which I come.

Mr. J. B. Hamilton (Leeds).—If I rise to say a word at this moment it is mainly in order to express my admiration for the paper which Mr. McElroy has given us. I think he can take this to heart, that it is about the only paper I have heard read at a meeting of this kind which has not been followed by a great number of speakers. The reason for this is that Mr. McElroy has practically finished the task, or, at any rate, what he did not say has been very ably said by Mr. Gordon. The matter of transportation in cities is one which I had the pleasure of bringing before this association two or three years ago, and I am glad to find many of the deductions I drew from my experience of tramway work have also been reached by Mr. McElroy and Mr. Gordon. There is no doubt whatever, I think, and our experience at all times proves it, that there ought to be a central controlling body. How that is to be constituted—as has been asked by the last speaker—must be decided according to the different conditions prevailing in different towns. To my mind, however, there must be, in addition to town planning committees, co-ordination with the central bodies which deal with street improvements. In Leeds we have, of course, the two authorities. We have a Town Planning Committee and a City Improvements Committee; and unquestionably whilst wide roads, with proper entrances and exits, into and from our great cities must be provided, we are gradually reaching in central parts by the increase in traffic of all kinds the condition of what Mr. McElroy has termed "saturation." In comparing Great Britain with America and the Continent, Mr. McElroy rather suggested a want of foresight on the part of local authorities. May I say that I think that is scarcely justified by the position of affairs. I take it that no tramway man of even ten years ago could have estimated such enormous developments of tramway transit during that period. I am of opinion that in many of our provincial towns, as well as in London, where there is now some congestion, if the width and space of the streets were more carefully utilised by better regulation of slow moving traffic, there would yet be sufficient room. The lowering of fares, with the spread of and the greater increase in the population of our cities, all have tended to an enormous development of traffic, which I think will continue. Go back ten years and look at the number of passengers carried then and look at what it was for the last year. You will then find a reasonable excuse is permissible for what Mr. McElroy has described as want of forethought on the part of the municipalities. I say that in order to put the picture as I see it fairly before you. I think, however, it is absolutely necessary now, when we realise the possibilities of cheap and frequent means of traffic, that the central authorities should wake up, and that there should be co-ordination between the different committees controlling the improvements of streets; the provision of large arterial entrances and exits, such as are the dream of town planners and tramway undertakings, so that the best results can be obtained. That leads on to this, that undoubtedly the local authority, to avoid superfluous and overlapping services, &c., should control all means of public transport in the city; and that is a conclusion to which everyone must come who has read Mr. McElroy's paper. I am very specially indebted to Alderman Smith for the hint he has given with regard to the class of gentlemen who dip their hands into the pockets of the tramway undertaking in Liverpool. I happen to be engaged at the present time with a colleague on a report dealing with city tramway facilities, and I shall keep that point in mind. (Laughter.) I do think that perhaps in the past many tramway undertakings have been considered as the milch cow of the various Corporations, and that all sorts of schemes initiated outside the Tramways Departments have been brought forward without consideration and on the assumption that their cost could be met by the Tramways Department. I think that should be avoided entirely, and the best way to do it is to form a joint committee of all the bodies interested in street traffic, so that whatever schemes may be adopted, the tramways shall be called to bear a proportion of any expenditure that is made, and have opportunities of seeing that their interests are conserved in the laying out of such streets.

Mr. J. M. McElroy, in reply to the discussion, said.—May I thank the various speakers for the kind words they have uttered about my paper? I do not know that there is much criticism to reply to. I am very pleased to have had the support of so able a gentleman as Mr. Gordon, who has looked deeply into this matter. He has followed my arguments so clearly, and has put them before you even better than I did in the paper itself. I think many tramway managers here may say, "Well, our city is a long way from wanting any of the facilities foreshadowed in the paper." Do not be too sure about that. We know that in every city the number of journeys taken per head of population is growing steadily; and sooner or later, probably in some cities much sooner than they think, the arterial roads nearing the city centre will have reached the saturation point, and they will be up against this very problem. (Hear, hear.) The lesson to be drawn from the paper is this. In many cities it is the custom to give large sums in relief of the rates—after having paid interest and sinking fund, and after having made some provision, more or less adequate, in the shape of renewals and depreciation fund, it is customary to transfer large sums in aid of the rates But remember what is coming along in the future. Each year we are gradually filling up our main arterial roads and in a few years' time new arteries, either parallel or underground, will be required. The lesson to be drawn from the paper this morning is that we should put sufficient by in the times when we are prosperous, so as to make adequate provision for those trying times which are ahead of nearly all the large cities in this country; and instead of giving such large sums in relief of the rates the policy should be to create a very large reserve fund to meet the development as and when it takes place. I do not know that I can say anything further. Mr. Wale raised a point, but all I said in the conclusion of the paper was that every city should have a permanent authority directing the traffic facilities over a wide area, not merely the city itself, and that could be done by Parliament, how and in what form would have to be considered on the merits of each particular case.

A hearty vote of thanks having been passed to Mr. McElroy for his paper, the conference adjourned for luncheon.

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AFTERNOON SESSION.

The President again took the chair at 2 o'clock.

Mr. G. W. HOLFORD (general manager, Salford Corporation Tramways), read the following joint paper :—

UTILISATION OF TRAMWAYS FOR GOODS TRAFFIC.

BY Messrs. G. W. HOLFORD
(General Manager, Salford Corporation Tramways),
AND W. CLOUGH
(General Manager, Bury Corporation Tramways).

When the preparation of this paper was first undertaken, it was intended to be submitted to the Salford Conference of 1914. The subject was considered a peculiarly suitable one by reason of the conference being held in Lancashire, it being then suggested the paper might deal principally with the conveyance of goods by tramways between the Manchester docks and the surrounding industrial districts. (The authors, we understand, were selected because one was the manager of the tramway system which offers access to the Manchester Ship Canal Docks, and the other the manager of a tramway system in one of the adjacent manufacturing towns). Owing to the outbreak of war the reading of the paper was postponed, but we were, however, recently invited by the Executive Committee of the Association (who thought the time now opportune) to submit a paper to this conference on the general question, and we were pleased to comply with their request. Whilst we may not present a solution of the problem, we nevertheless hope the information we are able to place before the meeting will be of material assistance and guidance, and that at any rate we may reduce the issue to what is practicable as regards the utilisation of tramways for the conveyance of goods.

We wish to pay our tribute to others who have on prior occasions dealt with this subject, and for this reason, and in order to deal with the matter in as complete a form as possible, we may perhaps be allowed to give a *résumé* of the views which have been expressed heretofore.

The first of our members to introduce to the Association the subject of the utilisation of tramways in this country for the conveyance of goods, as being one worthy of consideration, was our esteemed friend, the late Mr. C. R. Bellamy, of Liverpool, who in 1904, at the conference held in that city, in his presidential address, spoke at length on the matter, and stated :—

> "The Tramways Act of 1870 provided for a general merchandise traffic ; and while this class of business under company control has been practically ignored, it is probable that with inter-urban connections and joint municipal control it would become a very useful source of additional revenue, as well as a great boon to important sections of the trade of the country.
>
> "The only attempted solution of this problem was the effort to promote the construction of light railways, which by reason of their cheaper construction would, it was hoped, provide a network of mechanical carriage of great flexibility, capable of dealing with a traffic that the railways do not, and cannot, cater for.
>
> "An American has said, in describing a tramway goods system, that it was as flexible as an elephant's trunk and quite as capable of picking up small things, and that it could flourish on the crumbs that a steam railway would despise.
>
> "It is this power to pick up small things over large areas expeditiously, cheaply, and frequently, which the railway companies lack, and for which they should welcome us as allies.
>
> "The ever-increasing network of municipal tramways, with their connecting links, might quickly provide the whole country with a system cheaper in operation than was contemplated under the Light Railways Act, which would do much under proper recognition of its capacity to largely increase the trade and revenue of the country.
>
> "I believe there is a great scope for such a development of tramways in this country.
>
> "Traders and manufacturers could obtain or send light consignments of goods at any time under short notice to the connected towns, railways, or docks."

Mr. Bellamy's remarks may be said to have been chiefly directed to the usage of tramways on country roads for the conveyance of agricultural products, etc., but he also touched upon the question generally, and although an interesting discussion followed, it does not appear that any steps were taken to adopt his suggestion or that any tramway undertaking ventured to experiment in this direction.

In July, 1905, a meeting of Lancashire tramway managers was convened in Manchester to discuss this subject, and again, although everybody was convinced of the benefits to be derived both by the trading community and tramway owners, it was found there were many difficulties, especially with regard to loading and unloading, which appeared to block the progress of any scheme.

At a meeting of the Lancashire and Cheshire Tramway Managers' Association, held in Oldham in April, 1912, a paper was read on the subject, bearing more particularly on the utilisation of the tramways for the conveyance of raw cotton from the Manchester Ship Canal Docks to the various mills in Oldham and the vicinity. The same difficulties as to loading and unloading were again pointed out, and no solution could be suggested.

In the early part of 1913 the Manchester Press contained many references to this subject. It was stated that the delay in the conveyance and delivery of goods between Manchester and the mills and workshops of Lancashire was so great as to be causing serious concern amongst traders. The chairman of one of the largest workshops in Lancashire stated :—"It would almost seem as if the carrying powers of the country had not been able to keep pace with the productive powers of the nation."

Reports appeared in the Press of interviews with the heads of large commercial undertakings and eminent members of municipalities, all emphasising the great assistance which tramways could render to the commerce of Lancashire if a practical scheme could be devised whereby the tramways might be utilised for the conveyance of goods.

It was said "that tramway undertakings were losing a great source of revenue by not utilising the generating stations and tramway tracks during the night time." Amongst other benefits it was pointed out that the adoption of such a scheme "would relieve the congestion of the streets in the daytime, would reduce the present heavy motor traffic, and the cost of paving the streets would consequently not be so heavy." Any apparent difficulties were passed over by saying these could be very easily overcome.

At the conference of the Tramways and Light Railways Association held in Blackpool in 1913, Mr. E. H. Edwardes, the general manager of the South Lancashire Tramways Company, submitted an interesting paper, part of which referred to this subject, but again without any practical results.

More recently we find Mr. C. W. Mallins, general manager of the Liverpool Corporation Tramways, dealing with the question of the conveyance of goods from the docks over the tramway system, but so far the Dock Board has not favourably received the scheme.

Although this subject should interest all owners of tramways, it is one which peculiarly concerns the Lancashire systems, for, as will be seen from the map on page 272, no other county has such a network of tramways as those which connect the industrial towns of the County Palatine, or could derive more benefit from the utilisation of tramways for conveyance of goods, if this were practicable.

This continuous network of tramways covers the following street mileage, viz. :—

	Route Miles.
Ashton-under-Lyne Corporation	5½
Bolton Corporation	28¾
Bury Corporation	23¾
Lancashire United	33⅞
Liverpool Corporation	72¾
Manchester Corporation	96¾
Oldham Corporation	20½
Oldham, Ashton and Hyde Company ...	9⅛
Rochdale Corporation	16¾
Salford Corporation	30¼
Stalybridge, Mossley, etc., Joint Board ...	23¾
Stockport Corporation	20
Wigan Corporation	21½
	403

In a similar manner are the large industrial areas of Yorkshire linked together by tramway lines, and it does appear somewhat strange to outsiders that advantage has not heretofore been taken of this fact for the transport of other than passenger traffic.

Of course it is apparent to all interested in transport work—not only in the case of merchandise but in the case of passengers also—that the lesser number of hands such traffic has to pass through the better opportunities there are for organisation, and greater are the facilities to be afforded. Just for a moment let us glance at the position of a large city handling a busy passenger street traffic. Under municipal administration traffic can be dealt with on well organised lines with fares and services fixed on an equated basis, but if half a dozen or more private individuals were catering for the passenger traffic then disorganisation would follow and constant dissatisfaction ensue.

If the transport of merchandise over certain areas could be dealt with under one board or organisation there is no doubt that many of the grievances that at present exist would be removed, and many facilities and benefits would follow, but whether such a system could be introduced is a matter for the consideration of the whole of the interested parties in the several areas.

There have been several instances in this country where the use of tramways has not been solely confined to passenger traffic, and in order that there may be no misconception of the extent to which

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this has been done it is perhaps advisable that a brief description should be given of each case. Taken in alphabetical order they are as follow :—

BURNLEY.

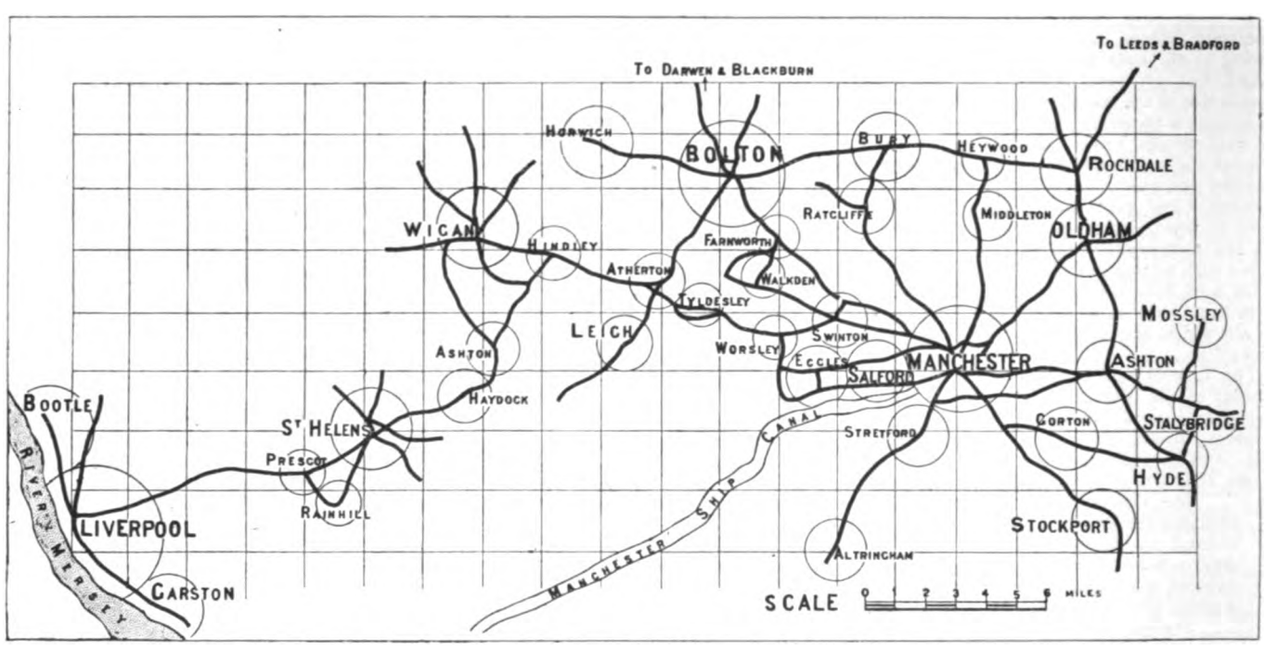
In September, 1912, the Corporation of Burnley commenced to run a goods waggon for the conveyance of heavy parcels, i.e., parcels between 56 lb. and 5 cwts. The charges were based on 3d. per cwt. per package, with a minimum charge of 3d. The goods were placed in an open wagon of the railway type, and if necessary covered with a sheet. This wagon was placed *in front* of a service car and propelled along the tramways. The fact that the wagon was placed in front of the car is worthy of notice, together with the opinion of Mr. Henry Mozley, the general manager of the Burnley Corporation Tramways. He states :—" It will be found much safer and more convenient to propel the wagon in front of a car than behind as a trailer. The driver is much more able to look after the safety of the wagon in the streets than the conductor on the rear platform of the car, as he is frequently away from his post, and passengers are in no danger whatever as they would be if the wagon was used as a trailer." It was found possible, without any inconvenience, to place this wagon in front of passenger cars working on a ten minutes' service. The wagon was run at specified times, and was allowed to stand at the terminus for ten minutes, and the sender or receiver of the goods had to meet the wagon on its arrival. The financial results were not satisfactory, and the daily running of the wagon has been abandoned, but it is now run on receipt of an order and a guaranteed load which will produce not less than 4s.

is 340 yards from the main line of tramways, and the Corporation incurred the expense of £1,243 for the requisite tramway connection. At the other end, each mill owner constructed his own tramway connection. Two self-propelled wagons were built, but only one of these is in daily use. From the illustration appended it will be seen that the wagons are similar to railway wagons, but are mounted on an ordinary tramway truck, and have a platform at each end and a trolley standard mounted on a framework in the centre. The bodies are 16 ft. long, 6 ft. 2 in. wide, and 3 ft. 9 in. deep, inside measurements. They are equipped with two Westinghouse No. 20 motors of 45 H.P. each. The tare weight is 9 tons 12 cwts., and the carrying capacity 10 tons, making a gross weight of 19 tons 12 cwts. The coal is discharged either at each side of the wagon, or from the bottom of the wagon through hoppers. During the year ending March 31, 1916, 12,121 tons of coal were conveyed.

LEEDS.

During the summer of 1910, the Corporation completed negotiations with certain contractors for the sand required in connection with the new filter beds of the Waterworks Department at Headingley. The quantity required was approximately 30,000 tons, and the distance about 3½ miles from the Sovereign Street Depot of the tramways department, which has a wharf on the river and canal bank.

To enable the work to be carried out suitable wagons with hoppers, and a 2-ton electric crane were purchased and installed. The conveyance began in September, and at March 31 following about 28,000 tons had been safely delivered, the revenue from this amounting to £1,660. After providing for all necessary charges, including



Map showing the Tramway Connections of an Important Section of Industrial Lancashire and Cheshire and the Accessibility to the Liverpool and Manchester Docks.

GLASGOW.

By the Vale of Clyde Tramways Act, 1871, the Glasgow Corporation have to allow the use of the tramways for the conveyance of goods and mineral traffic, with wagons and other vehicles in ordinary use on railways, upon payment to the Corporation of tolls, not exceeding six-tenths of a penny per ton-mile, on the weight of traffic so conveyed, exclusive of the weight of the vehicle, empty vehicles passing free of toll ; provided always that the Corporation shall be entitled to charge for traffic conveyed for three miles, or any shorter distance, any sum not exceeding twopence per ton.

This arrangement is at present in operation for the conveyance of materials from a railway station to one of the shipbuilding yards, a distance of nearly half a mile, for which the Corporation charge 2d. per ton. This was originally done by horse traction, but in 1905 it was considered advisable to use electricity, and the shipbuilding company provided an electric locomotive to haul wagons. In addition to the 2d. per ton for the use of the track, the Corporation now receive 1d. per ton for the supply of electricity. The weight dealt with in this way has been as much as 160,000 tons per annum.

HUDDERSFIELD.

Since September, 1904, the Corporation of Huddersfield has been utilising the tramways for the conveyance of coal from a railway siding to three different mills, two of which are a distance of three miles away, and the other five miles. The difference in level between the railway siding and the street is such as to allow the railway wagons to run over and discharge the coal into shoots, which empty into carts or tramway vehicles. This makes it possible to deal with coal delivered at the sidings from any colliery. The railway siding

full track maintenance, a very satisfactory net profit resulted to the undertaking. The cars conveying the material were all fitted with standard equipments, and were easily able to maintain the same effective speed as the ordinary service car, and therefore, although the whole of the work was carried on during the working day, it is stated that not the slightest inconvenience was caused to the travelling public. In the following year the balance of the 30,000 tons was conveyed, and the revenue received amounted to £248.

In a recent communication, Mr. J. B. Hamilton, the general manager of the Leeds City Tramways undertaking, states :—" Since that date the wagons have been found to be of very great use in conveying material for the use of the tramway and other municipal departments, but no further contracts were entered into until 1915, when further developments took place."

The developments referred to are as follow :—An agreement was entered into with the Leeds Fireclay Company, whereby fireclay and coal was conveyed over the tramway lines from the company's mines in Harehills to the works at Wortley and Elland Road, a distance of fully five miles. The operations commenced on October 4, 1915, but owing to war conditions the amount to be carried was much less than was anticipated.

For this purpose it was necessary to construct connections (at the company's expense) at the above-named termini, the hopper wagons owned by the department being utilised for the conveyance of the minerals. Mr. Hamilton in his annual report states :—

> " This commencement in the carriage of goods traffic for the general public marks an important era in the developments of the business of the tramway undertaking.

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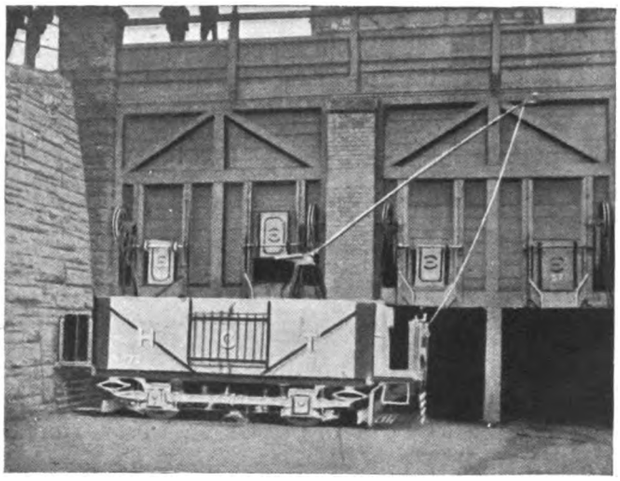
"In each of the Bills authorising the construction and operation of tramways in Leeds and district which have been passed by Parliament the very fullest powers for conveyance of goods, minerals, etc., upon the tramway lines have been carefully provided for, and no doubt this will in the future be found to be most valuable in serving the citizens.

"Owing to the contour of the district, all the railways and canals are placed in the southern half of the city, leaving considerable districts, principally residential, which are long distances from the railway and goods termini.



Huddersfield Tramway Wagon being Loaded with Coal.

"A properly devised scheme, by utilising the powers of the tramway undertaking to convey minerals and goods over its routes, would undoubtedly lower the cost of conveyance of materials to and from such districts, and very much reduce the wear and tear on the public highways."

We understand Mr. Hamilton is now engaged in preparing a scheme for submission to the tramways committee which will bring into effect the views expressed in his report, and that the experience gained by the conveyance of fireclay at the present time has been most satisfactory and encouraging.

There have also been other instances where the use of tramways cannot be said to have been confined exclusively to passenger traffic. A number of tramway systems convey their own permanent way materials on the tramways, and there are several systems on which important parcel departments have been instituted and special vans provided. In this connection we may mention the case of the Manchester tramways undertaking and Sutton and Company. The judgment which was obtained in this case has a most important bearing on the powers of a Corporation, and although of a somewhat lengthy character, we consider should not be omitted from a paper of this description.

This was an application in the High Court of Justice (Chancery Division) in February, 1906, by Messrs. Sutton and Company, for an injunction to restrain the Corporation of Manchester from acting as carriers or delivery agents except on their tramways, and from expending any of the corporate monies for that purpose.

The intention of the Corporation was to put into operation a large and comprehensive scheme. They proposed—

(*a*) To accept "cash on delivery parcels, i.e., parcels where the value thereof is to be collected by them on delivery and subsequently handed to the senders.

(*b*) "Express delivery," i.e., parcels to be delivered by special messengers at special rates and to insure parcels.

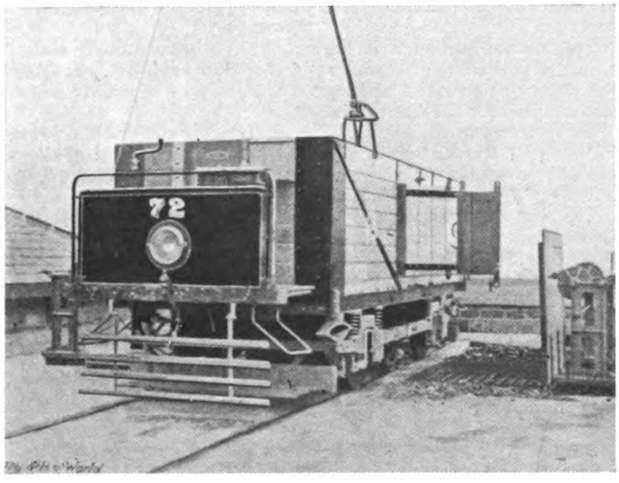
(*c*) To act as agents for all railway companies for the receipt of parcels, and to pay to the companies monthly all monies due to them for the carriage of parcels, in consideration of a payment to the Company of a penny per parcel for collection.

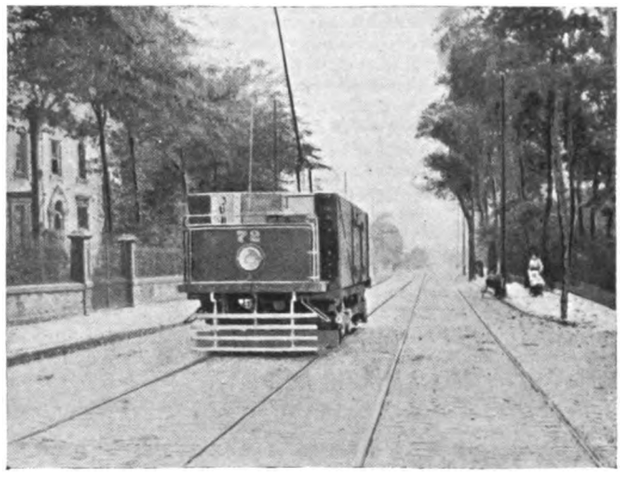
(*d*) To collect and deliver parcels outside the radius of their tramway lines altogether, between places having no connection with their tramways, and of goods which have never travelled and are not intended to travel by their tramways at all.

Mr. Justice Farwell stated:—

This Act, in my opinion, enables the Corporation to run carriages and take tolls on all the network of tramways mentioned therein, and use such tramways for the purpose of carrying passengers, and of conveying and delivering animals, goods, minerals, and parcels. Mr. Upjohn pressed upon me that there is no power to carry or deliver, but merely a power to use the tramways for the purpose of carrying and delivering, but this appears to me too narrow a ground to found a decision. I refer to the Railway Clauses Consolidation Act, 1845, section 86, and I find that there is no power to carry generally thereby conferred, but a power to "carry and convey upon the railways all such passengers, goods, etc." I am unable to see any real distinction between this and the power given to the Corporation by sections 8 and 22 of the Act, 1899. But a railway company acting "as all railway companies now elect to act, and as the defendants act," as carriers, and not as either toll takers or conveyers (see Mr. Justice Wills' judgment in "Hall *v.* L.B.S. Railway Company," 15 Q.B.D., page 557), have undertaken the ordinary duties of a carrier, as Mr. Justice Byles put it in "Taylor *v.* G.N.R.," L.R.I.C.P. 385, "the first duty of a common carrier is to carry the goods safely, the second is to deliver them." This duty to deliver would exist without the express use of the word in section 22, and I cannot read that section as restricting the Corporation to deliver upon the tramways in the absence of custom or of special contract.

I apprehend that a railway company is not bound to deliver at the house or shop of the consignee, but if they do not they are bound to keep the goods safely for a reasonable time, and to deliver to the consignee or his agents when he calls for them. But there is nothing *ultra vires* in their delivering by cart or otherwise, at the consignee's house or to any other place authorised by him, including the station of a railway company, such goods as they have brought on their tramway lines; such delivery is fairly incidental to their authorised business. As Lord Salisbury puts it in "Sowerby *v.* G.N.R.,"





Wagons Used for the Conveyance of Coal—Huddersfield Corporation Tramways.

7 R and C Cases, at page 170, "They (that is, the Great Northern Railway) are permitted by law to carry on the business, not only along their lines, but also in connection with and as part of the same general undertaking by which they make profit—the business of distributing the goods which they so bring from distant points to the places where the different consignees intend they shall be delivered. For that purpose they have to build stations both for the receipt and dispatch of goods which are so entrusted to them." It would be difficult in the present case to put any practical limits to the place of delivery; it cannot be at the terminus only—this is

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probably in the middle of the highway—some radius of space within which a receiving store may be situate must be allowed, and some means of conveying to this store must be permitted; there is no ground for confining it to manual labour—indeed, the weights mentioned in the schedule of tolls negative this—it must therefore be open to the defendants to use horses and carts even to get the goods to their own depot, and if they can do this I see no reason why they should not be allowed to convey them to the consignee's address, or some other place named by him. So far therefore as the expenditure complained of arises out of the working of their tramways undertaking as explained above, I can see no objection to it. The defendants are empowered to build goods stations for the reception and for the delivery of goods; to provide and pay for carts and horses and the like for collection and for distribution and to pay wages to men employed for these purposes; to provide buildings to house the horses and carts so used, to receive and transmit goods by rail, and to insure, for inasmuch as a common carrier is an insurer of the goods entrusted to him at common law, it must be open to the defendants to make a bargain limiting such liability or undertaking it on special terms. So far as regards "cash on delivery goods," I have no evidence that this is part of the business of a common carrier, and I can only say that if it is then the Corporation can accept goods for carriage and delivery on their tramways on those terms.

But this is all restricted to goods which travel along the tramways or some part thereof; there is nothing in the Acts to authorise the Corporation to act as carriers generally without reference to their tramways. The question, as is pointed out in "The Attorney General *v.* The London County Council, 1901," 1 Chancery, page 781, is not whether the business can be conveniently or advantageously conducted with the tramways business, but whether it is by necessary implication incidental or accessory to it—and I think that it is not—to collect and deliver parcels for the tramways is fairly incidental, and such reasoning would authorise the railway company to carry on a coal merchant's business, because they must buy coal, and this was restrained in "The Attorney-General *v.* The Great Northern Railway," 29 Law Journal (Chancery), page 794. For the same reasons I hold that the Corporation cannot act as general agents for the railway companies, but only in respect of tramway-borne goods. The defendants, however, further contend, and I think rightly, that the Corporation can so act by virtue of its corporate existence, and that this court will only interfere to prevent the expenditure of the Borough Fund on such a venture, but they say also that there is nothing to show that they have made any such expenditure. I have, however, already stated that they threaten and intend to do so, and I am not satisfied that they have not already done so. It is obvious that a delivery service by carts to and from villages not connected with the company, and a general agency for all railway companies, must entail expense even if the same carts and men be used as are employed ordinarily in tramway service proper; more of both are required, and there is wear and tear to be considered; the horse that delivered tramway-borne parcels only might last for years, while the journeys between outside villages might break him down in twelve months. I cannot believe that a large general delivery service and a general railway agency can be added to a service limited to the connection with tramways without expense. No evidence has been given on the amount of such expenditure, but the plaintiff is, in my opinion, entitled to an account at his own risk of all sums so expended.

I propose to make a declaration that the defendants are not entitled to expend any part of the city funds or the receipts of their tramway undertaking, or the proceeds of any city rate, or any other monies of the defendants or the city, for the purpose of establishing or maintaining or carrying on the business of carriers, except as part of and in connection with, their tramway undertaking, and in respect of articles carried along all or part of the tramways for the time being belonging or in lease to the Corporation, or on which they have power to place or run carriages, and to grant an injunction in similar terms.

Having endeavoured as far as possible to submit the past history of the subject, we will now consider whether there are any legal, physical, or financial difficulties which prevent the utilisation of our tramways for the conveyance of goods.

HAVE WE AS TRAMWAY AUTHORITIES SUFFICIENT POWERS?

1. *To undertake the conveyance of goods on tramways?*

There would appear to be no doubt that this we have. The usual clause reads, "The Corporation may demand and take in respect of minerals, merchandise, articles, and things conveyed by them on the Corporation tramways, including every expense incidental to the conveyance, any rates or charges not exceeding those specified in the schedule to this Act, subject to the regulations in that behalf therein contained."

In the case of the Manchester Corporation *v.* Sutton and Company previously quoted, it was decided that the words "including every expense incidental to the conveyance" empowered the Corporation to build warehouses and to undertake the collection and delivery of goods provided such goods in the course of transit travelled along the tramways. There would therefore appear to be no legal difficulty as to the actual conveyance.

2. *To run two or more attached vehicles on tramways?*

This, of course, could not be done without the consent of the Board of Trade. The Liverpool Corporation have recently been granted provisional authority to run two or more vehicles attached, and no difficulty need be anticipated in this direction.

3. *To lay down junctions and sidings into railway or dockyards and into mills, warehouses, etc.?*

The laying down of junctions, sidings, etc., is usually restricted in the local Tramway Acts to such as may be "found necessary or convenient for the efficient working of the Corporation tramways or providing access to any warehouses, stables, or carriage houses, depots, engine houses, generating stations, or works of the Corporation." There is therefore no power granted to construct lines into railway or dockyards or into mills and warehouses which are not owned by the Corporation, and if this were done it would have to be undertaken by the proprietors and, of course, with the consent of the road authority.

The Tramways Act of 1870 foreshadowed the probable use of tramways lines for other than passenger traffic, yet for 46 years, with the very few exceptions to which we have referred, the use of tramways in this country has been confined to passenger traffic and the conveyance of parcels. The 1870 Act contains the following clauses:—

25. Every tramway which is hereafter authorised by special Act shall be constructed on such gauge as may be prescribed by such special Act, and if no gauge is thereby prescribed, on such gauge as will admit of the use upon such tramways of carriages constructed for use upon railways of a gauge of 4 ft. 8½ in., and shall be laid and maintained in such a manner that the uppermost surface of the rail shall be on a level with the surface of the road, and shall not be opened for public traffic until the same has been inspected and certified to be fit for such traffic, in the prescribed manner.

34. The promoters of tramways authorised by special Act, and their lessees, may use on their tramways carriages with flange wheels or wheels suitable to run on the railway prescribed by such Act; and, subject to the provisions of such special Act and of this Act, the promoters and their lessees shall have the exclusive use of their tramways for carriages with flange wheels or other wheels suitable only to run on the prescribed rail.

54. If any person (except under a lease from or by agreement with the promoters, or under license from the Board of Trade, as by this Act provided) uses a tramway or any part thereof with carriages having flange wheels or other wheels suitable only to be run on the rail of such tramway, such person shall for every such offence be liable to a penalty not exceeding £20.

We submit the inference to be drawn from a perusal of the above clauses is that in 1870 it was intended that the same vehicle should, if necessary, be used on the tramways and on the railways, and that the railway authorities or other persons might by agreement acquire the rights of usage of the tramway lines.

We would next draw attention to a clause which is now usually found in the Tramways Acts obtained by municipalities (Salford Corporation Act of 1899 and Bury Corporation Act of 1901), which reads:—

"The tramways shall be constructed on a gauge of 4 ft. 8½ in., but carriages or trucks adapted for use upon railways shall not be run thereon."

This clause, although it may not have been framed with the object of superseding Section 25 of the Tramways Act of 1870, has the effect of preventing the use on tramways of a vehicle which is also adapted for use upon railways.

On referring to the Standing Orders relating to Bills deposited in Parliament, it will be found that provision is still made for the running on tramways of "carriages or trucks adapted for use upon railways," Clause number 13 reading as follows:—

"Where for a distance of 30 ft. or upwards it is proposed that a less space than 9 ft. 6 in. shall intervene between the outside of the footpath on either side of the road and the nearest rail of the tramway, or a less space than 10 ft. 6 in. if it is intended to run on the tramway carriages or trucks adapted for use upon railways." So that evidently the before-mentioned clause (Salford Corporation Act, 1899, and Bury Corporation Act, 1901), has been inserted into municipal Acts which only provide this space of 9 ft. 6 in. (and we take it that the cases where 10 ft. 6 in. has been provided would be exceptional) to secure compliance with this Standing Order, the object of which no doubt was to provide for the greater "overhang" of a railway wagon as compared with a tramcar.

In the utilisation of tramways for the conveyance of goods however great an advantage it might be to use the same vehicle both on railway lines and on tramway lines, we must at the outset accept the following facts:—

(*a*) That railway wagons cannot be run along tramways as at present constructed, because their overhang is too great as against the 11 in. in the case of a tramcar. The wheels, which are 5 in. wide and have a flange of 1 in., are not suitable for grooved rails.

(*b*) That tramway wagons cannot be used on railway lines because the wheels are not wide enough to pass over the gap of 4 in. in railway crossings—the wheel flanges are too small to safely negotiate the curves even at the slow speed attained in goods yards or sidings.

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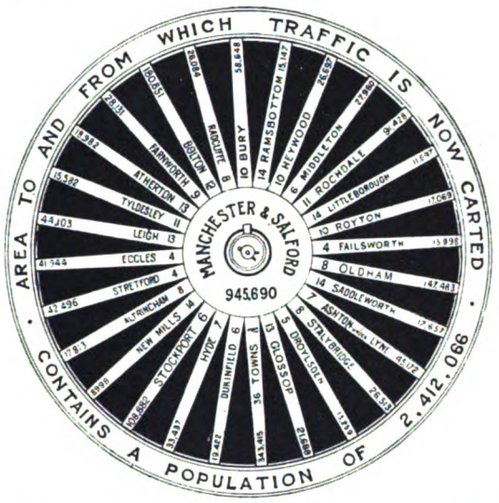
In dealing with the general subject of the transport of goods, we have confined our attention principally to the following classes, as being those which might afford fields for operation by tramway undertakings, namely, the collection and delivery of goods :—

(1) Between towns separated some distance apart, i.e., Liverpool and Manchester ; and

(2) Between towns fairly adjacent to each other, as demonstrated in the following diagram.



(3) Between dock or railway yards and the mills, manufactories, etc., in the immediate locality.

We have first to consider what are usually the methods in vogue for dealing with this traffic, and taking the above in numerical order we find :—

Between towns separated some distance apart.

1. This work is carried out by the combined use of horse, petrol, or steam vehicles, and railway lines and wagons. How does the position of the tramway undertakings compare in this case ? The goods have to be collected from a point and conveyed to a railway siding or depot (they could be just as easily collected and conveyed to a tramway depot), they are then transported by rail to another depot or siding in the town of delivery (they could be just as easily conveyed from the tramway depot over the tramway lines to the tramway depot in the town of delivery) ; they are then conveyed by horse, petrol, or steam vehicle to the mill, works, etc., where they are required (this work could be just as easily undertaken by the tramway authority).

What, then, are the advantages possessed by either party ?

The railway companies are enabled to transport large train loads at one time which the tramway undertakings could not do. Nor could the tramway undertaking from a financial point of view deal with loads of a small character, as the revenue to be derived would not cover the working expenses. But with loads of a moderate character the cost of transport between towns would certainly be cheaper as compared with the present railway charges.

Taking, for instance, the cost of providing and running on the rails a self-propelled tramway vehicle carrying 10 tons at 10d. per mile—(again remembering that not only must there be a sufficient load but also a sufficient distance, for clearly we could not undertake to carry 10 tons one mile for 10d., any more than we could undertake to carry one ton 10 miles for 10d.)—and assuming a distance of 25 miles, and making no allowance for a return load, the tramway charge would be 41s. 8d., or a carriage rate of 4s. 2d. per ton, whereas the railway rate (an actual case having been taken) was 13s. 2d. per ton. This leaves a large margin out of which to provide any warehousing or loading facilities at tramway depots.

It must, however, be expected that as soon as it became a question of competition as to which could do the work the cheapest, the advantage would be decidedly with the railway company, and whilst it may be in the interests of the trading community that the railway companies should be called upon to face competition, this alone is not sufficient to warrant municipalities entering into such competition.

The tramway undertakings might be able to still further reduce the handling of these goods by the laying down of sidings (where convenient) from the tramway lines direct to the mills, warehouses, works, etc.

But even under the most favourable circumstances, i.e., where the mill or warehouse is on the line of route, and there is sufficient space to build a tramway curve and line to the point of loading and unloading, there must be the requisite points and crossings, and although the extent of traffic in exceptional cases might warrant the expense of these, no tramway manager wishes to increase the number of points and crossings on a line used for passenger traffic. There, however, may be localities in our manufacturing districts where there is a cluster of mills and warehouses, and where it might be of advantage to construct a branch line for the conveyance of goods. To obtain access to the large warehouses of our cities (usually situated in very narrow streets) by means of tramway sidings is entirely out of the question.

On this point we quote from the paper (previously referred to) of Mr. Edwardes. He said :—

> " I have gone into the question very carefully with a great number of manufacturers, and have found that the small amount of tonnage handled in a mill or factory during twelve months would not pay the interest and sinking fund in connection with the erection of a siding for carriage of goods into every mill, but I see no reason why central goods yards should not be established in the manufacturing areas, and the goods transhipped on to the motor or horse lorries and delivered to the various mills by them."

If the transport of goods over the tramway lines between towns of the character referred to developed to any large extent, then it might be found desirable to construct central goods depots (in lieu of the use of tramway depots) at points or positions found to be most suitable.

There is also one other phase to be considered in referring to this class of business, and which is dealt with later in the paper, and that is the introduction of a vehicle that could utilise to some extent the benefit of the tramway system, and at the same time dispense with much of the expense consequent upon the several processes of handling now in vogue.

Between towns fairly adjacent to each other.

2. On referring to the diagram, on a previous page, it is apparent that in large industrial areas there must be a considerable interchange of goods traffic of a varying character between towns lying adjacent to each other. This work is at the present time partly carried out by the utilisation of the railways (as mentioned in the previous classification), but mostly by the employment of horse, petrol, or steam vehicles. Can tramway undertakings compete successfully for this traffic ? We are forced to the conclusion that this can only be done by the use of a vehicle which could avail itself in part of the benefit of the tramways and yet be on equal terms in the handling of the goods, and which we will refer to after the next classification. Where the goods are conveyed partly over the railway, as in Class 1, then the handling by the tramway undertakings would be on equal terms with that of the railway, with a possible reduction, as in the previous case ; but the length of tramway to be utilised would be of a shorter character, and the cheapness of transportation less in proportion. When the goods are conveyed by vehicles (horse, petrol, or steam), the handling charges are reduced to a minimum, and the financial benefit would be entirely in favour of this method, except probably in the case of horse vehicle transportation, but even then the cost of handling forms such a serious item in the consideration of the subject that it would be unsafe to say that the tramway method would be the cheaper.

Between dock and railway yards and the mills and warehouses.

3. The work referred to in this classification may be said to-day to be entirely carried out without the utilisation of railway lines, but solely by horse, petrol, or steam vehicles, with one handling for loading and another for unloading. Can the tramway undertakings compete successfully in this case ? Except in isolated cases where conditions are particularly favourable (such as the Huddersfield, Leeds, and Glasgow instances) we are of opinion that they could not. With the introduction, however, of some such vehicle as that referred to in paragraphs 1 and 2 we believe to a very large extent they could. Therefore in considering all these classes of work we arrive at the same conclusion, i.e., the necessity for a vehicle which can make use to a great extent of our tramways and at the same time reduce the handling of the goods to a minimum. A vehicle of this description (which by the kindness of the designer we have had the pleasure of inspecting) has been introduced as an experiment by Mr. C. J. Spencer, the general manager of the Bradford Corporation Tramways.

It may shortly be described as a

Railless Trolley Battery Vehicle.

In appearance it is similar to a petrol-driven wagon with the addition of a trolley and boom. Details of equipment :—The equipment of the chassis of the railless trolley battery vehicle is identical with the ordinary railless trolley chassis as used on the Bradford Tramways, that is to say, two 20 H.P. motors with ordinary series—parallel control, and will therefore operate on a 500-volt circuit. The earthing device is an extension of the steering arm of the vehicle bearing on the track by the medium of a cast-iron block, and at the same time automatically steering the vehicle. (This device, which has been used with considerable success for some time, in connection with the ordinary trackless trolley cars when taking them over the tramway routes to depot, was designed by the general manager of the Rotherham tramways, Mr. E. Cross.)

The accumulators employed are of the Edison type—120 cells, giving a normal voltage of 150.

They supply current to the ordinary 500-volt motors, the only difference being that the motor with battery supply runs correspondingly slower, that is, *pro rata* to the voltage, but as the torque of

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a series motor is proportional to the current passing through the windings, the vehicle is capable of climbing steep gradients but at a speed corresponding to the low voltage.

Whilst the vehicle is running on the 500-volt circuit the batteries may be in series with the motors, thus charging them whilst the car is in trolley service.

The battery is capable of running the vehicle about ten miles.

The change-over from the battery to overhead wire is merely a question of throwing over a switch, the putting of the trolley on the wire and the earth connector on to the steering gear.

Photographs of the vehicle are appended.

Mr. Spencer has very kindly supplied some details as to the usage of the vehicle to date, as follows :—

" The experimental vehicle for this purpose was constructed and actually put into use on May 15, 1916, and has been running up to June 17 inst.

" During that period 741 miles have been run, and 247 tons of material have been carried varying distances, and according to market rates it has earned £73 14s. Various kinds of merchandise have been handled, including wool, stone, vitriol, sand, and other material.

" In this period 85½ hours have been spent in the depot, where the vehicle has been undergoing various experimental alterations and repairs to chassis. Had these alterations and repairs not been necessary (and they would not have been had not the vehicle been an experimental one) the vehicle would have been available for a further 85½ hours, and under those circumstances the total earnings would have been £17 more, making a total of £90 14s.

" In order to arrive at the cost of earning this money it would be obviously unreliable to take the actual expenditure on this experimental vehicle. There would, first of all, be great difficulty in arriving at the correct capital value of the vehicle in question. The chassis and equipment which are being used have been taken, almost literally, off the scrap heap, and therefore one might be tempted to give a very low capital value to the apparatus.

" It is therefore necessary to assume what would be the price under normal conditions of special vehicles for the work. I estimate that a vehicle, including accumulators, would cost from £800 to £900."

After a careful comparison of working costs of this type of vehicle as against petrol-driven vehicles Mr. Spencer is of opinion that the advantage is much in favour of the electric battery type, and he states :—

" Summed up it seems that this vehicle would cost in round figures £10 per week, working six days per week and running 240 miles, against £12 5s. for a petrol vehicle doing the same work. The figures, so far as the actual revenue from the experiment is concerned, must be examined in the light of the fact that we have been able to select very advantageous traffic and obtain, in some cases, a return load. If this vehicle is used in its proper sphere, viz., doing a large percentage of its work on the tramway track and using power from the tramway trolley wire, its operating costs will be from 20 per cent. to 25 per cent. less than a petrol vehicle doing the same work in the same time. Generally the experiment has been exceedingly successful, and gives promise of good results in the future."

Whether such a vehicle would be sanctioned for general use by the Board of Trade under the existing powers granted to Corporations for the working of tramways is somewhat doubtful, but it is more than probable that little difficulty would be experienced in the obtaining by such authorities of additional powers to run these vehicles where it was shown that their introduction would benefit industry in many directions.

SUMMARY.

We must apologise for the somewhat lengthy character of the paper submitted to the conference, but we felt that the subject was one which was worthy of our careful consideration, and that the data supplied by us might be found useful to many of our members.

We would desire to summarise our opinions in the following manner, namely :—

1. That the utilisation of tramways between towns fairly distant apart for the conveyance of goods would prove of a remunerative character under certain conditions, which we have already referred to.
2. That there should be no difficulties in the way of interchange of goods traffic over various tramway undertakings, as the interchange of passenger traffic under like conditions has already proved capable of easy and smooth working.
3. That the work should be undertaken by a Joint Board representing the several tramway undertakings interested.
4. That the utilisation of tramways for short distance goods traffic does not offer any prospects of a remunerative character, unless
   (*a*) A vehicle can be used which can avail itself of some of the benefits of the tramway system, and compete on other terms equally with the vehicles at present carrying out this work ; and
   (*b*) That works and depots or sidings are situated at a favourable distance from the tramway lines, as in the case of Leeds, Huddersfield, etc., to which reference has already been made.

We desire to thank the various gentlemen who have assisted us in the preparation of the paper by the loan of blocks and the verifying of details of their respective undertakings.

Railless Trolley Battery Vehicle—Bradford Corporation Tramways.

THE DISCUSSION.

Mr. C. J. SPENCER (general manager, Corporation Tramways, Bradford).—I should like to congratulate the authors on their excellent paper. I think I was somewhat instrumental in asking them to read this paper, and it is only very proper that I should take the first opportunity of thanking them for their work. In my judgment the subject they have selected is most opportune. The war has certainly given the whole nation, if not the whole world, a thorough shaking up. Old prejudices and old ideas are being abandoned, and new ideas are being, and will be, carefully scrutinised and examined. In no domain will the healthful effect be felt so much as in the transport world. It is therefore particularly opportune that we municipal tramway operators should consider how best we may help in solving the great transit problems of the future. I hope our past achievements will act as a plea for a respectful hearing for anything that we may suggest in this direction in the future. It seems that if we can handle passenger traffic to public advantage, we ought also to be able to handle goods traffic to public benefit.

The authors, however, quite properly submit the whole problem to a very searching and detailed examination as to what class of traffic might be most advantageously handled by tramways, and what class of traffic may not be advantageously handled by tramways. It is, of course, obviously and absolutely true that unless tramway systems can handle traffic more economically than it is handled at present, using the word " economical " in its broadest and widest sense, it is useless to put forward any scheme. The whole question may therefore be summed up in a few words. Can tramways be utilised for the conveyance of goods and merchandise to the public advantage ? It follows that unless the income obtainable from the handling of merchandise is at least equal to the expenditure, it would be useless to consider the matter further. At

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what cost per ton mile is it likely that a tramway can handle goods? Taking a very rough and ready and admittedly a broad estimate, if a tramway system had, say, 100 cars, each car with its average load weighing, say, 10 tons, running, let us say, 100 miles per car per day, it means that in the gross 1,000 tons are carried 100 miles per day, or 100,000 ton miles. If the total cost of operation be taken at 10d. per car mile, the cost will be 1d. per ton mile gross. Let us suppose that if instead of carrying passengers we were carrying goods, and that the dead load to be carried was 50 per cent. of the total load, it would mean that the net cost would be 2d. per ton mile. It may, of course, be urged, and quite properly, that some fallacies underlie this very rough and ready method of estimation. Not every vehicle would be full of merchandise all the time; neither does it follow that the average speed of the vehicle would be so good as the average speed of vehicles carrying passenger loads. The question of dead time when the vehicle is being loaded and unloaded would have to be taken into consideration. It must be remembered that we are dealing with a dead load and not a live load—a dead load that has to be put on the vehicle as against a live load which puts itself there, and so on. On the other hand, it must not be forgotten that the vehicles themselves need not be so expensive as the vehicles carrying passengers; that the cost of ticket collection, ticket checking, etc., would be considerably modified. But I submit that there is, broadly, a *prima facie* case for examination, and what is of first-class importance is that a very big percentage of the capital expenditure of a tramway would, in the event of goods being carried over the same lines as passenger lines, be divided by a much higher car mileage; that is to say, the tramways transit machine is not now in most cases used to anything like its full capacity, and, to quote a phrase from our friends the electrical engineers, the addition of goods traffic would improve the load-factor materially. At any rate, any figure in the neighbourhood of 2d., 3d., or even 6d. per ton mile for pure transit is a figure well worth considering.

Can tramway vehicles handle traffic at a less cost than petrol or steam? I have had a very considerable amount of experience with petrol vehicles, and I have had the advantage of long consultation with transport experts who have had experience with both steam and petrol vehicles of modern construction, and the general impression formed in my mind is that there is not much to choose between the relative efficiency of either petrol or steam, working under normal conditions, and everything considered, so that in comparing hypothetical tramway costs with petrol costs, one is not in reality leaving out the steam vehicle. Electric power is considerably cheaper than petrol power. The cost of repairs, lubrication, and even driving is cheaper with electric vehicles, whether on rails or off rails, than petrol, and so far as one can see is likely to continue so. On the other hand, the flexible character of a self-contained car is a very valuable asset. Quoting *Punch*, "It is not confined to a silly groove," so that it may be a question of debate and experience as to which class of vehicle is the most suitable for any definite class of traffic. In making comparisons, however, between tramways and petrol, it must be remembered that the petrol goods vehicle does need a road on which to run, and, at the present time, it does not provide and maintain that road; but the road has to be provided, and its cost both for provision and maintenance has to be paid for, and if the question be examined from a broad public point of view, the cost of road provision and wear must be added to transit costs. In the case of a tramway, of course, the road is provided and maintained by the tramway authority, and the cost of the road provision and maintenance is, of course, automatically charged against the income of anything carried over it.

The main question in connection with the proposal to carry goods on tramways is: "Will the carrying of goods by tramways help in any way to solve street congestion?" Is it not quite correct to say that the proposition resolves itself into a question of replacing a disorganised system of transit by an organised system? Is it better to allow transport to remain in the hands of sundry individuals, who of necessity are disorganised, and are not using—in the broad sense—the best vehicle for the work which they may be doing, nor are they, nor can they, be properly controlled by the street or other authority in which they are operating? A public, or even a semi-public, body, working under suitable legislation is of necessity more amenable to the public interest than unorganised and largely irresponsible bodies or individuals. Again, has it not been proved in the past that the placing of passenger traffic under the control and management of properly organised bodies has resulted in great public advantage? Is it not, therefore, reasonable to expect that the placing of goods transport under similar control and management would result in similar conditions? It has been pointed out to me by men who are very greatly concerned in the future industrial warfare of this country—and who are certainly not pro-tramway—that the future of this country depends largely upon the efficiency of its transport, and particularly of local transport. What then can we, as municipal tramway men, offer towards an improvement of our present system or want of system? I submit that we can offer an organised system for a disorganised system, and whether we use vehicles with flange wheels or vehicles with rubber tires, vehicles run by electricity or vehicles using petrol, the issue is scarcely affected. Certain it is that if tramway undertakings are charged with the duty of handling goods traffic, they will, if they are allowed, use the most efficient vehicles for the purpose, and keep abreast of the times. Surely as tramway men we can claim that we have "won our spurs" with passenger traffic and are therefore worthy of being considered in questions where the carriage of goods is concerned.

I apologise for not having quite acted the part of critic of the paper. My difficulty was that I had very little to criticise. I thought I might add a little to the paper and to some extent join with the authors in this matter.

Ald. VARWELL (Exeter).—Does the question of gradient come in?

Mr. SPENCER.—No, it does not affect the matter.

Mr. H. MOZLEY (vice-president, general manager, Burnley Corporation Tramways).—Mr. President, as an old goods traffic man, perhaps you will excuse me if I get up, as there seems to be a good deal of hesitation below the table. This is a subject in which I have taken an interest ever since I became acquainted with tramway work. As to the general desirability of tramways handling goods traffic, I do not think that there can be two opinions if you consider the advantages. At any rate, you will see that the authors of the paper have not questioned the advantages to be derived from handling goods traffic. Perhaps I need not labour that side of the question, for it is obvious that in an area, say, covered by a ten-mile radius from a big centre, the local goods traffic must be of considerable volume, and the railway companies do not care to be bothered with such short journey traffic. I have found in Burnley the railway people are quite open to deal with us in handing goods over to us and collecting goods to be forwarded during the experiment with the goods wagon, to which the authors of the papers have referred. But in dealing with this question generally, and in reference to the paper, I should like to make a few additional remarks. I think that the paper has been praised very much by our hon. secretary, but perhaps I could have added a few additional remarks, or a few items, if they had taken the trouble to consult me.

Mr. HOLFORD.—We did, Mr. Mozley.

Mr. MOZLEY.—There is one very important matter if you are considering the question of handling goods traffic—you must look to your statutory charges. In the early eighties, when I first dealt with the question, I found the company powers assumed train loads, that they were so low that it would be impossible to handle small loads, and therefore after giving the system of goods on road and rail truck a trial with a locally converted wagon, we found if we had succeeded in obtaining a successful truck, we could not make a profit because the statutory charges assumed train loads. Happily, now Parliament has sanctioned such statutory charges as will enable us to handle single wagon loads, or two or three, but not train loads. If you will just make a note of these figures and compare them with your own charges at home, perhaps you will see how this important question stands with regard to yourselves. For coal, coke, etc., 3d. per ton mile, with a minimum of three miles for charges. I should emphasise the point that in all these charges there is a minimum, of three miles. For iron ore, etc., 4d. per ton mile; sugar, grain, corn, etc., 5d. per ton mile; cotton, wools, drugs, etc., 6d. per ton mile; carriages, 1s. per mile; small packages—7 lb. 3d., 14 lb. 5d., 28 lb. 7d., 56 lb. 9d.; above and under 500 lb. any charge the Corporation think fit to make. If you have statutory charges similar to these, I think that if it is possible to obtain a suitable vehicle to handle goods traffic, it could be done with advantage to ourselves and advantage to the community—the commercial community—and if you can convince them of this, I have no doubt that a very great advantage both to the tramway undertaking and to the commercial community would obtain. Referring to the paper again as far as night traffic is concerned, I think night traffic would be intolerable; it is quite objectionable and altogether unnecessary. You can work goods traffic in the day time amidst your ordinary services just as easily as you can passenger traffic. I do not see the slightest difficulty about that. Then the authors refer to large areas. They have taken the systems on the Manchester side. Now I would have you observe that there they are all 4 ft. 8½ in. gauge, but on the western side, what we call the north-east division of Lancashire, we are all 4 ft. guage, and we have a similar network, which in time, I believe, will have physical connections from Bradford down to Darwen and including the Rossendale valley. Then this goods traffic would become a very important matter indeed. Of course, running powers and interchange of traffic are quite as easy to arrange as is the case with passenger traffic, but there again you will have to be careful; you will find that there is a variety in your statutory charges. There is another difficulty which we found in handling the road and rail wagon. We gave it a thorough trial. Now, we have the ancient carrier; the ancient carrier is going on to-day as he has done for hundreds of years, that is, I believe, ever since the introduction of wheeled vehicles. We have from our centre to the outer districts, covering a radius of ten miles, carriers going daily with loads from one ton and upwards. It was that class of traffic that I was catering for with this experimental goods wagon, and I believe that we can only handle that traffic successfully by the use of a road and rail truck. The vehicle must go to the collecting point—that is the manufactories, warehouses, or to the shops—and deliver the goods to the consignee wherever he may

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be, both along the road and at the end of the journey. Only in that way can we put ourselves in a position to do this work. Otherwise that traffic will never be secured. There again—and Mr. Baker will support me in this, and will show you how aged the question is—Perrett, a French tramway engineer, devised a very good road and rail truck, and I went to inspect it in the Rochdale depot. But I found that it was too heavy and complicated for practical use. But it does show that this problem is one that can be solved, in my opinion, provided that we have sufficient encouragement in the offer of traffic. The road and rail truck which we tried was merely fit for horse haulage; it would not stand mechanical traction; it would not keep to the rail. I believe the road and rail truck is the ideal and true solution of the problem. Whilst I am on that, I might refer to Bradford, because I believe that is likely to be a very successful method of dealing with goods traffic, simply because it has been going on for years in the shape of petrol and steam. It is not a tramway method, except so far as obtaining power is concerned. If you are going to adopt the Bradford system, then we shall have to go to Parliament for fresh powers. We have no powers to deal with heavy motor traffic, and therefore there is a difficulty there which will have to be overcome before we can do it. But it does seem to me that that is another very fine alternative to the road and rail truck. Then there is a question or two that I would like to put to Mr. Hamilton, whom I am glad to see here smiling as usual. I find that according to the paper he is carrying minerals at the rate of 1s. 2·22d. per ton for 3½ miles. This works out at 4d. per mile. How can he make a profit out of that? We could not handle minerals at 4d. per mile, that is certain. Perhaps he will explain that to us. Then he has also entered into a contract for the carriage of fireclay; perhaps he will also tell us what rates he is going to charge for that, and also what his statutory charges are, so that I can make a useful comparison. Then I was surprised to see that the authors of the paper say that there is no power for a tramway undertaking to make sidings to works, etc. I believe that they are entirely wrong, at least they are so far as we are concerned. We have the power to put a siding down to a works, not our own but anybody's works. The clause authorising these sidings is as follows:—"The Corporation . . . make maintain alter and remove such crossings passing places sidings junctions and other works in addition to those particularly specified in and authorised by this Act as they find necessary or convenient for the efficient working of the tramways by this Act authorised or for providing access to any warehouses stables or carriage-houses or works of the Corporation or their lessees." It would be foolish to give us statutory powers to carry minerals, coals, and carriage of all kinds of things without some means of carrying it out. Therefore I believe the authors are quite wrong in regard to saying that a tramway undertaking has no power to put down sidings to other people's works. And, in fact, you have Huddersfield contradicting you right away; there they have put down sidings in a colliery which cost £1,000. So it is quite clear from that that you are wrong on that point. You have listened to me with great patience, and I thank you. It is an old subject with me, and I rather believe that I have not heard the last of it, now that it has been so ably dealt with by my friends Mr. Holford and Mr. Clough. But I do hope that we shall find the best minds in the tramway world studying the subject and dealing with it in a thorough manner. I mean, I hope that the inventors will do something, for I do not think that we have yet got a suitable vehicle to deal with goods traffic on tramways, and if what these gentlemen have done encourages tramway undertakers to experiment in carrying on a goods traffic, then I shall be very thankful indeed, because I think, after many years' consideration of the question, I have failed in my own district.

Mr. J. B. HAMILTON (general manager, Corporation Tramways, Leeds).—I desire at the outset to congratulate the authors of the paper. I was quite prepared to give them a whole-hearted eulogium for the method in which they have handled this question until I heard that they had not consulted Mr. Mozley. (Laughter.) I think that shows a lack of knowledge on their part which ought to receive our very severe censure. However, notwithstanding that disability, I think they have produced something which ought to direct attention to a very serious problem of the moment. The question of the utilisation of tramways for goods traffic presents itself to my mind from two points of view—the first being in the interests of the city, what we shall avoid in removing or reducing the inconveniences and street congestion which arises from the carriage of goods and minerals on other vehicles than by rail transit. In our particular case at Leeds, the whole of the material we are now carrying, between 400 and 500 tons a week, used to be conveyed in ancient steam tractors with trailers. Their passage through the busy streets was a constant source of danger and annoyance to the persons using those thoroughfares. As compared with that method the minerals are now conveyed in a not, perhaps, very perfect wagon, because we have not got a perfect one yet according to Mr. Mozley, but in a vehicle which compared with the old state of affairs is certainly much less obtrusive, and which follows the orderly line of traffic in the streets. From that point of view it is a great advantage to the city, and in that connection I think many of our cities might very properly consider the conveyance of some portion of the heavy traffic which is now conveyed by steam tractors or petrol or horses along the street. It would, I think, assist in the elucidation of the problem which we were considering to some extent this forenoon. Now, the second point of view is the question of relative finance. I have no doubt in my own mind whatever that as compared with the non-rail form, given suitable conditions, goods can be conveyed at a cost and at prices which no steam or petrol vehicle can face. Recently we had a contract given to us by the company which is referred to in the paper, and it was arranged at prices which are considerably less than they were paying at a time when there was very keen competition for the business. So we have obtained the advantage of removing the old objectionable form of traffic from the streets and are conveying it at prices which are much less to senders and are remunerative to us. On that point, I was sorry to hear my friend Mr. Spencer talking about 2d. a mile. Notwithstanding that, Mr. Mozley refers to 3d. and 4d. as being practically the statutory charge allowed by Parliament in the case of Burnley for the conveyance of goods of that class—heavy minerals, fireclay, and so on. Our figure in Leeds is approximately 3d. per ton mile. When I came to consider the question of cost, I satisfied myself that we could not, looking to the delay in loading and unloading, the provision of special vehicles, and so on, face it at our schedule price of 2d. per ton mile. I can quite understand that in the early days, when these schedules attached to tramway powers were arranged, that the tramway men of those days had a very remote expectation in their minds of carrying any goods traffic, for if they had gone into the matter there is no question at all that they would have seen that the schedule prices were far too low. The consequence is we have made an arrangement, and our price is arranged at 3d. per mile. A rate per mile is, of course, merely a relative term, because it may depend on varying conditions. We are carrying five miles—from one side of the central portion of the city to the other—avoiding as far as we can the busiest streets, and all these conditions have to be allowed for. The senders do the loading and assist us in the emptying, and they have paid for all the terminal connections. In the result we make a very little profit out of it after covering our working expenses, etc. I mention those figures in this detail because I suggest that tramway undertakers who are considering this question, or who may have to consider it in the near future, ought to see that their powers are brought into line with what I think will be found to be the necessary practice. I do not think there is any other point, and I have answered Mr. Mozley's question.

Mr. R. H. WILKINSON (general manager, Huddersfield Corporation Tramways).—Referring to the statement made in the paper (on page 275), "Taking, for instance, the cost of providing and running on the rails a self-propelled tramway vehicle carrying ten tons at 10d. per mile," and then a comparison is made with the railway cost. I should like to point out that in this calculation it has never been considered what the cost would be if the vehicle conveyed 20 tons or, in other words, had a trailer attached conveying a total load of 20 tons, with the same driver and conductor. The cost would then be considerably reduced. A railway certainly has many trailers, but even with this great advantage it appears that their cost of carriage is about three times the cost given for a single tramway vehicle. After my twelve years' experience conveying coal by the tramways, I agree that the rate of 10d. a mile is a very fair figure at which goods could be conveyed. A few years ago I had to consider the question of goods haulage on rather a large scale, whereby the tramways would have been handling about 159,000 tons of goods a year. I drew up a scheme for conveying those goods from the railway siding to the works, which were only ¾ mile away, by means of a self-propelled truck with a flat top, capable of carrying a railway goods wagon complete with its load, the truck to run on the tramway lines and driven by motors in the ordinary way. This would avoid the handling at the railway siding and considerably reduce the cost of conveyance. Now for that purpose I intended laying a track especially for the purpose all the way, not utilising the existing lines at all, owing to the width of the railway wagons, and was quite confident that I could have carried those goods at the 3d. per ton per mile rate even for that short distance. Unfortunately the railway company prevented the above scheme being carried out. Whilst considering this matter, my attention was called to the fact that a similar scheme had been in operation in Germany for some years. I therefore went over to Germany and saw the very thing I had been planning in actual use. Whilst there I also saw a light railway which had been constructed, reaching out several miles into the country, and they charged at the rate of 7d. per ten tons per mile. I am quite convinced in my own mind that goods can be carried at a remarkably cheap rate. There is just this about it; when once the system has been inaugurated there is little further trouble. It is a dead load in every sense of the word, no complaints of any description coming in. I think that is all I can usefully add to the paper.

Mr. J. M. MCELROY (general manager, Corporation Tramways, Manchester).—In connection with this subject of carrying goods on the tramways, I think we may say there has been a maximum of talking and a minimum of doing. I think that about hits the situation. I was reading the other day that when the Tramways Act of 1870 was before the committee, it was at the suggestion of

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certain Lancashire people—the authors of the paper to-day are Lancashire men—that the clause about running railway trucks on tramways was inserted with the object of facilitating the delivery of goods from the railway to the various warehouses, stores, etc., in Lancashire. That was the object of putting in the words which the authors have mentioned. Now, if we are to look into the general principles of this matter we should ask ourselves, why were rails put down in streets at all? They were put down because far-sighted people could see that by running vehicles with metal wheels on metal rails they could for a given expenditure of energy carry about twice the load that they could on ordinary road vehicles. That was the elementary principle which caused tramways to be laid down and used in the streets. It acted very well for carrying passengers, because passengers collect and deliver themselves; they walk to the tramway and they walk away, and there is no trouble in collecting or delivering. But immediately we begin to touch goods we are up against the terminal difficulties. We have either to carry the goods to the tramways by separate vehicle or we have to put sidings into the warehouses. If we carry goods to the tramway and deliver them by means of separate vehicles from the tramways, then unless we have a fairly long run, say, as the authors have suggested, 25 miles, the advantage of the cheap transit on the tramways may be watered down by the terminal charges. That is a very elementary principle which we should never forget. Now then, as regards carrying on rails, even as far as 25 miles, unless we have actual sidings my opinion is that there may be difficulties in successfully competing with the railways. So it comes to this; it is obvious that the advantage of using tramways for carrying of goods is confined, speaking generally, to those places where we can construct tramway sidings into works and can collect and deliver the goods by vehicles run entirely on the tramway rails. Do we not observe this in connection with our own permanent way? We use our tramways for carrying permanent way material when we can run direct into the depot, and carry the goods right on to the job on a tramway vehicle. But even in our permanent way departments there are many loads which we have to carry off the tramways, and in these cases we use petrol, electric, or horse vehicles, because the material cannot economically be carried on tramways on account of the terminal difficulties. Since our good friend Mr. Bellamy brought forward this subject at our Liverpool conference in 1904, there has been a revolution in road transit. The petrol vehicle has come along, and it has absolutely revolutionised road transit. In those days we did not clearly foresee what the petrol vehicle was going to do as a commercial vehicle. I do not care to say that tramways cannot be utilised for carrying goods, but the introduction of the petrol, steam, and electric vehicles has so revolutionised matters that we shall have to hesitate very much before saying that tramways can be generally used for carrying goods, except in the special cases mentioned. Mr. Spencer's vehicle is an exceedingly good one, but it only incidentally touches the subject of this paper. The authors started out to talk about the carrying of goods on the tramways so as to obtain the advantage of the cheap transit of running on rails. Mr. Spencer's vehicle makes the attempt to get cheaper transit, not by running on rails, but by taking energy from the trolley line, and in this way he hopes to beat the petrol vehicles. He thinks that if he can get cheaper energy from a central power station he can successfully compete with petrol, steam, or battery vehicles. If he can do it, his vehicle will undoubtedly be a great advantage, provided the disadvantages from other points of view do not outweigh the economical one.

Mr. W. CLOUGH (general manager, Bury Corporation Tramways), in reply, said: Mr. Holford and I discussed who should read this paper; it was arranged that he should do so and that I should reply to the discussion. However, Mr. President, I do not find much in the discussion to reply to, but I will say to Mr. Mozley that I think it was rather too bad of him. Being on the Executive Committee of this association, he was one of those who compelled us to deal with this subject, and he comes here and tells us that it is an old subject. Although Mr. Mozley is an old goods traffic man, he has altogether—and he admits it—failed to arrive at a solution of this goods traffic business. Then he puts on us the solution of the problem which has baffled him. That was not quite fair. Mr. Mozley is somewhat concerned that he cannot carry goods in Burnley, and he says that within a ten-mile radius there are goods to be carried, and he is concerned that he cannot carry them at 3d. per ton per mile. Now, Mr. Mozley, if you can get 1s. 3d. a mile out of that traffic, why should you not get it as well as the revenue from your present passenger traffic? Mr. Holford and I have gone carefully into this, and we can assure you, Mr. Mozley, that you are all right at 3d. per ton per mile. You said you could not make a profit because the charges were too low, being based on train loads.

Mr. MOZLEY.— said the companies in 1879. The new statutory charges which I quoted are quite different.

Mr. CLOUGH.—There is no suggestion on our part that this goods traffic might take place in the night time. We never suggested that at all; if you will look in the paper you will find that is so. In Mr. Mozley's words, it would be "intolerable and altogether unnecessary"; we agree with him that it can be done in the day time, and that there are times of the day on most provincial systems when you can pass along goods traffic without intertering in any way with the passenger traffic. On the question of gauge, I looked on the map carefully to see where Burnley was—(laughter)—to see what the gauge was, but that did not interfere with our map. We agree that to use for goods traffic the vehicle of Mr. Spencer, Parliamentary powers would have to be sought. I do not find there is much else to reply to. The main principle Mr. Holford and I found in this matter was that if we could get the towns in Lancashire with sufficient distance between them and with sufficient loads to be carried—you must have a load and you must have the distance—then a tramway was in just as good a position as a railway to undertake the conveyance of goods. We could convey the goods as easily between each of the depots as the railway company can convey them between their present railway goods yards. They have to deliver the goods, the tramways would have to deliver the goods. We went to see Mr. Spencer's vehicle, and we thought that was the better use to put it to—to distribute the goods from the tramway depot. I was hoping we should have had a good discussion. I thank you very much, on Mr. Holford's behalf and my own, for the kind attention which you have given to our paper.

A hearty vote of thanks was accorded to Mr. Holford and Mr. Clough for their paper, and to the president for presiding.

The conference then concluded.

FRIDAY'S PROCEEDINGS.

ANNUAL BUSINESS MEETING.

The fifteenth annual general meeting of the Association was held on Friday, September 22, at the Surveyors' Institution, Great George Street, London, S.W. The President (Mr. Peter Fisher), occupied the chair, supported by the following members of the Executive Council:—Vice-president, Mr. H. Mozley, Alderman H. Linsley, J.P., Mr. A. R. Fearnley, Mr. J. Dalrymple, Mr. A. Baker, Mr. W. Clough, Alderman S. Flint, J.P., Mr. T. B. Goodyer, Councillor G. A. Johnston, J.P., Mr. J. B. Hamilton (past president), Mr. G. W. Holford, Mr. J. M. McElroy, Alderman J. Miles, J.P., Mr. S. F. James (hon. solicitor), and Mr. C. J. Spencer (hon. secretary and treasurer).

The HON. SECRETARY read the notice convening the meeting.

The PRESIDENT.—The minutes of the last annual general meeting are printed in the Proceedings of the Association, and they are generally taken as read. Is that your pleasure?

The minutes were then formally confirmed.

The HON. SECRETARY announced the arrangements for an inspection of London County Council trailer cars, a visit to the London County Council generating station at Greenwich and central repair depot, and for inspecting the work of the Woods-Gilbert rail planer at Bexley Heath.

The PRESIDENT.—The next item on the agenda is "president's remarks." There is only one that I have the privilege of making this morning, and it is this, to express the hope that the business may be got through as expeditiously as possible, seeing we have an appointment at 12 o'clock on the Embankment. In addition, we want to have a few minutes placed at the disposal of members to ask questions or submit any information they may have to present to us on any subject they may consider of importance.

ANNUAL REPORT OF THE EXECUTIVE COUNCIL.

The annual report of the Executive Council was then submitted. (The text of the report is given on pages 283-286.)

The PRESIDENT.—Members are entitled to ask any question or to discuss this report.

Councillor HIGHAM (Vice-chairman, Blackburn Tramways Committee) moved the deletion of the paragraph headed "British Trade After the War" (page 285).

The PRESIDENT.—You will observe from the information given under that heading that another association has brought this to our notice, and, as indicated in the address yesterday, we really have some grounds for concern for the future. We believe that the economic struggle in the future will be very severe, and we are just anxious that everyone will put his back into this business and so do his best to hold up the British end of the plank. That is all we mean in those few words.

Councillor HIGHAM.—But I want to point out that you are opposing the British end of the stick. As I read the resolution of the I.M.E.A., they view with deep concern the possibility of being forced to hold up the British end of the stick. I want to know why the Council or this Association should support them in that. I contend that it is our duty, all of us, to hold up the British end of the stick as much as possible. I believe that in passing this resolution we are going against that.

The PRESIDENT.—Is there any other question to be raised on this report?

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Councillor HIGHAM.—Is there no member of the Executive Council able to answer my question? We want a lead in this matter. We want to know what is the position of the Executive Council; we do not want the matter shelved by proceeding to something else. I hope there is some member of the Executive Council who will answer the question.

The PRESIDENT.—I have answered it in my way; perhaps the Hon. Secretary will add something.

Councillor HIGHAM.—If there is no better explanation than what has been given I shall move the deletion of this paragraph from the report, because I believe that to pass a resolution like this is practically to express the idea that we cannot possibly do without trade with the countries with whom we are at present at war. That is how it strikes me. The Board of Trade sub-committee's recommendation is perfectly simple to my mind, and as far as the explanation I have heard up to now, it must be simple. It reads thus:—"All Government departments, local authorities, and statutory bodies entrusted with the control of monies raised by taxes or rates should be under legal obligation to purchase, so far as possible, only goods produced within the British Empire." Now, I cannot understand why we should oppose that. We are fighting a war such as the world has never seen before, and if at the conclusion of this war we are not going to do all we can to prevent Germany or her Allies from raising their heads again in the manner they have done in the past, then I say the generations that follow us are going to have to face a war as terrible as this. The one way to my mind in which this country can prevent any recurrence of the present horrible struggle is to do what this recommendation asks us, viz., that after the war we should do all that lies in our power to prevent Germany economically from ever being able to raise the monies required to arm or fight and slave for another struggle. To my mind this recommendation of the Board of Trade sub-committee is framed with that end in view, and it is a certainty if we do not follow that out it will enable the enemy to raise hopes again, involving us in another struggle. If we can do without German manufactured goods and German firms at a time like this, if our tramways, as you pointed out, sir, in your able presidential address yesterday, have gone on so well, if fares have been allowed to go on without being raised scarcely at all, if we can do that without the aid of Germany in times of stress surely we can do it after the war, to enable us to prevent them ever economically raising their heads as far as we possibly can. In face of the fact that the Executive Council themselves do not seem to understand where they are in supporting what the I.M.E.A. proposes, I have great pleasure in moving the deletion of this paragraph which contains the resolution.

Councillor W. R. CLARKE (chairman, Walthamstow Tramways Committee).—I have much pleasure in seconding that. I cannot see why the Executive Council should view with concern a measure that will give the trade to England and not to your enemies. They give you "as far as possible," and I take it, Mr. President, that means the whole. I happen to be one of those individuals who think we are able to produce as good stuff in England as they can in Germany, and under those circumstances — —

Mr. J. DALRYMPLE (general manager, Glasgow Corporation Tramways).—I rise to a point of order. Is there anything in the resolution that affects Germany? Is Germany even mentioned or suggested? I beg to suggest that these two gentlemen are entirely out of order.

The PRESIDENT.—I think that the gentlemen who have just spoken have taken rather a limited view of the subject. This is not to prevent Germany from replacing the damage done in Belgium, or to prevent her from paying those great indemnities which we and others hope to get. Germany will have to have some means of earning the money that she must pay. We are going to compete with Germany, and I trust we shall be able to defeat her, but that is not the point at all; that economical question I do not think arises in the way that has been put forward by these two gentlemen. If we are only going to use materials and articles produced in this country, what are other countries going to do for us? Shut us out from purchasing from them, and they will not purchase from us? That may be, but a question of that kind is not one that we can discuss here this morning.

Councillor W. R. CLARKE (Walthamstow).—On a point of order, I do not know whether we are in order or not.

The PRESIDENT.—It is the fact that Germany is not mentioned here at all. You two gentlemen are suggesting that we are bringing up Germany by adopting this resolution of the Executive Committee, but there is nothing in it to give you any reason to say that at all.

Councillor HIGHAM.—I submit that your resolution is in support of the I.M.E.A., which opposes this recommendation of the sub-committee of the Advisory Committee of the Board of Trade. That recommendation advises that all local authorities and other statutory bodies whose money is raised by rates and taxes shall be legally required, as far as possible, to purchase things manufactured in the British Empire, not simply in this country.

Mr. J. DALRYMPLE (Glasgow).—I rise to another point of order—is our revenue raised by rates or taxes?

The PRESIDENT.—I do not think so, sir.

Alderman S. FLINT, J.P. (chairman, Leicester Tramways Committee).—I think there is a certain amount of misapprehension somewhere, and I think there is no sign of weakness in admitting it. Personally, I think the position taken up by our friends on that side of the room, if it is in order, is a correct one, and I do not think we shall be doing anything wrong by agreeing with it. I only speak for myself, as one of the Executive Council, and I think we shall be well advised to drop that clause altogether.

Mr. C. J. SPENCER (hon. secretary).—May I attempt to explain matters? Will you please first of all carefully read the recommendation of the sub-committee of the Board of Trade? It is:—"All Government departments, local authorities, and statutory bodies entrusted with the control of monies raised by taxes or rates should be under legal obligation to purchase, so far as possible, only goods produced within the British Empire." Now, whether that is good or whether it is bad, why should it apply only to local authorities? Why should we as municipal tramway operators or as electrical engineers be compelled to buy in a restricted market when the rest of the community can buy where they like? Now is not that our position as municipal tramwaymen? (A member: "No."). You have of course read into this that we must not in the future trade with Germany or with somebody else, but it also means that we must not trade with France, that we must not trade with Russia, that we must not trade with a score of other places. As the resolution reads, your Executive Council view it with very grave concern—the report states that they are concerned in any attempt to restrict the activities, the business activities, of municipal tramways, and that is the idea of the report.

Mr. H. H. GORDON, J.P. (deputy chairman, London County Council).—I would urge that after the clear explanation given by the Secretary, the matter should be allowed to drop. I speak as one who is particularly interested in the L.C.C. Tramways. We have to meet very strenuous opposition, we are a commercial trading concern, we are to be under a legal obligation to purchase only at home, whereas our competitors may do exactly what they like. It may be right, no doubt we shall do this—in fact, in the L.C.C. we always give a preference to the home market—but that is a different thing to asking us to bind ourselves under legal obligation to purchase only at whatever prices any ring of home manufacturers may put upon us. That is the only point. Nobody in this country wishes to bolster up Germany, I do not yield in my patriotism to any member who has spoken, but it is a different thing to say that I must bind myself hand and foot to buy in a restricted market, and with all due respect I venture to think that the resolution the Executive Council came to is the right one. We do not want to bolster up Germany, but at the same time we do not want to tie ourselves hand and foot in our commercial undertakings, while our competitors are left free to to do as they please.

Councillor HIGHAM.—May I point out that the secretary and Mr. Gordon have entirely misrepresented the Board of Trade recommendation. The last speaker laid particular stress on the fact that we are binding ourselves hand and foot to purchase only in the British Empire, whereas the recommendation says to purchase "as far as possible"; that makes all the difference between your interpretation and the larger definition of it.

The PRESIDENT.—Do the mover and seconder of the amendment to delete this paragraph insist on their motion?

Councillor HIGHAM.—I insist as mover.

The PRESIDENT.—Very well. I will put the motion.

On being put to the meeting the amendment was lost.

Councillor J. TIMPSON (chairman, Portsmouth Tramways Committee).—I want to refer to the question of disabled soldiers and sailors mentioned in the report. You will remember that every municipality gave an undertaking that all men discharged from the services should be reinstated. At Portsmouth we are being met with a rather serious difficulty in connection with this matter, that is to say, up to now a good many of our men have returned physically unfit to undertake the position they vacated on joining the services. I do not know whether the Council of the Association has taken that aspect of the matter into consideration or considered what is best to be done with these men. We are rather in a difficult position as far as these men are concerned in Portsmouth. Men are returning weekly, they come and offer themselves, of course, under the promise which was given them, yet they are physically unfit to undertake the work. I particularly allude to motormen who are coming back very weak and quite unable to take up their old positions on the cars they left. This is a matter which to my mind will go on and the difficulty will increase.

The PRESIDENT.—That is a question which we will consider at the right time, when the other business has been considered.

Mr. L. E. HARVEY (manager and engineer, Ilford Tramways).—I wish to refer to the paragraph on Lights (Vehicles) Order, 1915. I should like to draw the attention of the Executive to the fact that in the metropolitan area the police are enforcing this Order for placing lights on the front and rear of cars. Outside the metropolitan area I believe the Executive Council have got the consent of the Home Office to forgo this provision, but in the metropolitan area we are now having to put these lights on the front and rear of cars at great expense. Not only that, but I am officially informed that in the future it is going to be a permanency and not a question for the duration of the war only.

The PRESIDENT.—That will be a very suitable question for the Executive Council to consider later.

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Mr. G. W. HOLFORD (general manager, Salford).—I beg to move the adoption of the report.

Mr. T. B. GOODYER (general manager, Croydon).—I beg to second.

The motion was agreed to.

TREASURER'S REPORT AND STATEMENT.

The PRESIDENT.—The next item is the treasurer's statement of accounts and balance sheet.

HON. SECRETARY and TREASURER.—The accounts and balance sheet are set out at the back of the report. It is my duty to read the auditor's certificate as follows:—"In accordance with the provisions of the Companies (Consolidation) Acts, 1908 and 1913, I beg to report that I have obtained all the information and explanations required respecting the accounts of the Association, and in my opinion the above balance sheet is properly drawn up so as to exhibit a true and correct view of the state of the Association's affairs, according to the best of my information and the explanations given to me, and as shown by the books of the Association. (Signed) William J. McCombe, auditor, Hull, August 8, 1916."

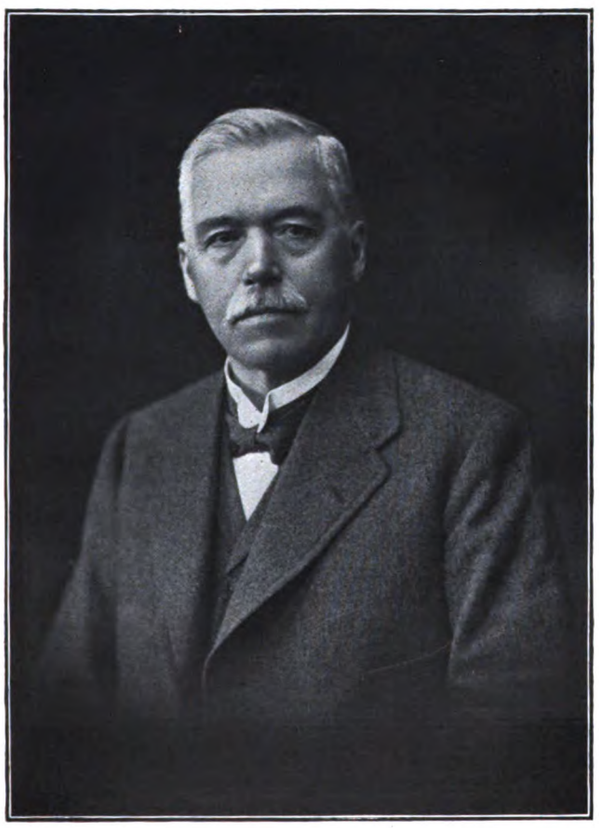
Mr. J. B. HAMILTON (general manager, Leeds).—I move the adoption of the treasurer's report, statement of accounts, and the balance sheet.

Mr. A. ELLIS (engineer and manager, Cardiff) seconded the motion, which was agreed to.

The meeting then proceeded to the election of office bearers for the ensuing year.

ELECTION OF PRESIDENT.

The PRESIDENT.—The first office to be filled is that of president. I have the honour of submitting to you the name of Mr. Henry Mozley, general manager, Burnley Corporation Tramways. (Applause.) It requires no eloquence to commend Mr. Mozley to you.



Mr. Henry Mozley.

Among tramway men in Great Britain there is no better known man than Mr. Mozley. I have not the slightest doubt that he will maintain the dignity and efficiency of this Association during his year of office as well as has ever been done. I have pleasure in submitting the name of Mr. Henry Mozley as president. (Cheers.)

Alderman F. A. DUNSFORD, J.P. (chairman, Southampton Tramways Committee).—I have very much pleasure in seconding. I have known Mr. Mozley for a great many years. He has attended every conference that I have attended. I think we are safe in the hands of Mr. Mozley, and that the appointment will be very popular.

The motion was agreed to with acclamation.

Mr. HENRY MOZLEY (general manager, Burnley).—Mr. President and gentlemen, I thank you very heartily for the high honour you have conferred upon me. I recognise that it is a position of great responsibility, and I shall do my best to uphold the honour of the Association and its usefulness. We ourselves appreciate the importance of the Association, and know the vast amount of business which we have to look after. A few figures, which will not take a moment in reading, will help outsiders also to realise the value of an institution of this character in connection with tramways. The latest figures are for the year 1913, and owing to the war we have had none for 1914-15, but these are quite sufficient:—

Capital Expenditure.	Percentage of Total.
£52,449,469 Local Authorities	68
£24,749,211 Companies	32
Route Length.	
1,616 miles: Local Authorities	60
1,044 miles: Companies	40
Number of Cars.	
9,342 Local Authorities	73
2,931 Companies	27

Corporation employees, 55,208.
Total capital expenditure, £77,198,000.
Total route length, 2,660 miles.
Total number of cars, 12,773.
Paid in relief of rates or for other purposes, £609,466.

I would like to say a word or two with regard to the work of the Association in the future. I think that work is likely to be of even more importance and heavier than it has been in the past. But happily I have been preceded by a number of gentlemen of very wide experience and capability, and therefore I enter this office with far more confidence than I otherwise should have done. I promise you that during my presidential year I shall do everything I can to forward the interests of the Association. I beg to thank you. (Applause.)

THE VICE-PRESIDENT.

The PRESIDENT.—The next appointment is that of vice-president, and I shall be glad to receive a nomination.

Alderman S. FLINT, J.P. (chairman, Leicester Tramways Committee).—It is always a pleasure to give honour where honour is due, and I am sure that course generally prevails in our conferences. I have very great pleasure in proposing the name of Alderman John Miles, J.P., the chairman of Bolton Tramways Committee, as vice-president. Succeeding, as he will, in the natural efflux of time, to the presidency of the Association, we know that Alderman Miles is an enthusiastic worker. He has done good work in his own town, and has been a very devoted and loyal worker in the cause. He is fully qualified for this position by the loyal and earnest service he has rendered, not only to our conferences, but also in the work of the Executive Council. We feel as we look upon him we can venerate him, and we shall be able to look up to him with respect as a man of mature years and of solid service. I am sure that he will uphold the dignity and usefulness of the position.

Mr. G. W. HOLFORD (general manager, Salford).—I have very great pleasure in seconding the proposal that Alderman Miles be elected vice-president. I happen to know him well, being in Lancashire, not only in connection with the work of the parent Association, but also with regard to the branch work we carry on up there. We always find Alderman Miles ready to come and give a hand and to do anything for our tramway systems. He is extremely courteous; in fact, I do not know a more courteous gentleman anywhere, and under him I am sure we shall get along as well as we have done in the past when it comes to the turn of Alderman Miles to be elected to the presidency. (Applause.)

The PRESIDENT.—Are there any other nominations?

None being forthcoming, Alderman Miles was declared unanimously elected.

Alderman JOHN MILES, J.P. (chairman, Bolton Corporation Tramways Committee).—Mr. President, Alderman Flint, and Mr. Holford, I am so taken by surprise that I can only express to you my deep gratification that I have been thought at all worthy to occupy the position of vice-president of this Association—this useful institution. It is quite true that I do take a very warm interest in its work, and in my humble way I have tried to do the best I can for my own town, which I love so well. I cannot accept one compliment which has been paid me of being good-looking—I do not accept that. (Laughter.) I am what I am, and I can only promise faithfully to do the very best I can in the interests of this institution of which I have such great pride in being a member. Please accept that as being the very best thanks I can give you all for the great honour which you have been good enough to bestow upon me. (Applause.)

On the suggestion of Mr. A. BAKER (general manager, Birmingham Corporation Tramways), it was decided, in view of the business to be transacted, to defer the 12 o'clock inspection of London County Council trailer cars, Mr. J. K. Bruce (deputy chief officer of London County Council tramways) kindly undertaking to arrange for this inspection to take place when the members left for the Greenwich generating station and the Bexley tramway works.

The thanks of the meeting were accorded to Mr. Bruce for his courtesy.

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ELECTION OF MEMBERS TO THE EXECUTIVE COUNCIL.

The PRESIDENT.—We have now to proceed to the nomination of members of the Executive Council, and I will ask the secretary to explain the position.

The HON. SECRETARY.—I think you all have printed ballot papers. There are five vacancies on the Executive Council. Two members of the Council retire by rotation this year, namely, Mr. W. Clough (Bury), and Mr. T. B. Goodyer (Croydon). Mr. J. Dalrymple, whose period as a past president expires, is eligible for election on the Executive Council; failing election at this meeting, Mr. Dalrymple will be without a position on the Executive Council for the coming year. I have already told you that there are five vacancies. Mr. Clough, Mr. Goodyer, and Mr. Dalrymple are available, and nominations are required to fill the other two vacancies. It is suggested by the Executive Council, although, of course, it is a matter for this meeting and a matter for nomination, that Mr. W. J. McCombe (Hull), who has retired from the auditorship of the Association, might well be nominated and put on the Executive Council, and also our good friend, Sir John W. Courtis, as representing the committee side. But that is entirely a matter for nomination, and all those five members must be nominated at this meeting, and, of course, as many more as the Association decide upon.

Mr. John Aldworth and Mr. L. Slattery were appointed scrutineers.

Mr. J. BARNARD (general manager, Bolton Corporation Tramways).—I should like to ask the secretary if there are not two laymen vacancies this year?

The HON. SECRETARY.—The by-laws set forth what shall be the minimum proportion of laymen to managers. As a matter of fact last year the number of committee members on the Executive Council was in excess of the minimum requirement set out in the by-laws.

The following gentlemen were nominated:—Sir J. W. Courtis, Mr. W. J. McCombe, Councillor Timpson, Mr. W. Clough, Mr. T. B. Goodyer, and Mr. J. Dalrymple.

HON. SECRETARY AND TREASURER.

Alderman H. LINSLEY, J.P. (chairman, Salford Tramways Committee and past president).—It gives me great pleasure to propose the re-election of our old friend, Mr. C. J. Spencer, of Bradford, as hon. secretary and treasurer. In spite of anything he may say to the contrary, I hope that the meeting will unanimously elect him. He would be very hard to follow, although he himself had an excellent man to follow. I am pleased to say that the secretarial duties during the time Mr. Spencer has been our hon. secretary have been performed in a manner highly satisfactory to everyone, and his great knowledge of the business of the Association makes it most important that he should be re-elected.

Alderman J. MILES, J.P. (Bolton).—I have great pleasure in seconding. I have had the pleasure of moving it on more than one occasion and I did my best to be eloquent. I want you to understand that in my opinion a better secretary could not be found if you went through the whole country. Now that is a good deal to say, but I know him. I know how courteous, how kind he is, how attentive he is to his work, and how greatly he has the interests of this important Association at heart. I trust we may have the advantage of his services for many years. (Applause.)

The motion was carried with acclamation.

Mr. C. J. SPENCER (Bradford).—Mr. President and gentlemen, it is a source of great gratification to hear the way in which you have proposed, seconded, and carried this resolution. This is the end of my fifth year in this position, and I was hoping that I might get somebody who would take on the burden and responsibility which naturally appertains to a secretary. Unfortunately, however, I have not been able to succeed in finding a gentleman who will take on this office, which certainly has its good points and also its bad ones. But if you do desire me to continue for another year I shall be very glad to serve you to the best of my ability. I think, however, it is only my duty to say, and to say it in the presence of my own deputy chairman, who is here to-day, that it would be impossible for me to carry on the business of this Association without the hearty consent of the Bradford Corporation. Now, I do not know whether I am entitled to continue for another year without the full consent of that body. The position of course entails a good deal of office work. When the matter was mentioned to them some five years ago, they very willingly and very heartily said "you must do what you can," and gave me very full powers. But the matter is now going on into the sixth year, and really they ought to be consulted before I finally decide to continue the work. I do not know whether Mr. Lund, my deputy chairman, who is here would like to say a word; but I feel a little diffident in going on longer without knowing what the opinion of my principals may be.

Councillor J. LUND (vice-chairman, Bradford Tramways Committee).—I think our committee will take the re-electing of Mr. Spencer so unanimously this morning as a great honour, and I do not doubt that they will be quite agreeable for him to continue the work which he has done so well during the past five years.

Mr. SPENCER.—After that, Mr. President and gentlemen, I cannot but continue my duties for another year. (Applause.)

HON. AUDITOR AND HON. SOLICITOR.

The PRESIDENT.—With reference to the appointment of hon. auditor, as you have already been advised the name of Mr. J. F. Simpson, engineer and manager, Preston Corporation Tramways, has been put forward for election, and notice was duly given in the notice convening the meeting.

Mr. J. S. D. MOFFET (general manager, West Ham) moved the election of Mr. J. F. Simpson as hon. auditor.

Mr. R. R. GREENE (general manager, Wallasey) seconded and the motion was agreed to.

Mr. J. F. SIMPSON (Preston).—I thank you, Mr. President and gentlemen, for the honour you have done me.

The HON. SECRETARY.—One of our hon. solicitors, as you see on the paper, is Mr. Pickmere, town clerk of Liverpool. In the ordinary course of business he would have again come before you for re-election. But Mr. Pickmere is an exceedingly busy man, and whilst he is of great assistance to us he cannot devote very much time to his office, and we need a lot of time to do our business. Still in his important position as town clerk he is of great value. But in Mr. S. F. James,

Alderman John Miles, J.P.

who unfortunately is out of the room just now, we have a gentleman who has been of very great assistance indeed in regard to the detail work. He has at all times freely given his advice, assistance, and time to the Association. But a change has taken place during the year in his circumstances, which technically makes him ineligible for membership. It is an Article of the Association that a member must be a representative of a town where municipal tramways are in operation. The Corporation of Ilkeston, where Mr. James is town clerk, have sold their tramways, and they are no longer operators of municipal tramways. That is very little short of a disaster to the Executive Council and to the Association, for Mr. James has become exceedingly valuable to the Executive Council, and it was decided to confer honorary membership upon our good friend Mr. James, so that we may retain him as our legal adviser. I move that Mr. S. F. James be appointed an hon. member of the Association in recognition of his services as our hon. solicitor.

Mr. J. B. HAMILTON seconded the motion, which was agreed to.

Mr. E. R. Pickmere, town clerk of Liverpool, and Mr. S. F. James, town clerk of Ilkeston, were then unanimously re-elected as hon. solicitors.

The HON. SECRETARY.—Mr. James has asked me in his absence to say that he is willing to continue the work and thanks you for the honour you have conferred upon him.

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The PRESIDENT.—We have now come to the end of the printed agenda.

An informal discussion on various matters then took place.

VOTE OF THANKS TO THE PRESIDENT.

Alderman H. LINSLEY, J.P. (chairman, Salford Tramways Committee).—I have a resolution put into my hand which I shall propose with great pleasure, though I think it is a duty which ought to fall to our vice-president. It is that the best thanks of this meeting be tendered to our president for his services during the past year. Now the bulk of the members do not see very much of the president, except at these annual gatherings. I am sure that everyone will admit that during the past two days that we have met here the president has occupied the chair with very great ability. He has been suffering from loss of voice, but he has shown this morning that not only can he be firm, but also that when the president has ruled the matter is settled. With regard to the Executive Council I can say that our president has been of very great service. He has only missed one or two meetings, and we can quite understand that when we remember the long distance he has to come and that during the winter months he may be prevented by snowstorms. He has been an exemplary president and has fulfilled all the expectations we entertained of him. I have great pleasure in moving that our hearty thanks be tendered to him for his services. (Applause.)

Alderman Sir J. W. COURTIS, J.P. (chairman, Cardiff Tramways Committee).—I have much pleasure in seconding. I have not had the opportunity of meeting the president on the Executive Council, but I am pleased to say that I shall have that pleasure in future, the members having to-day done me the honour of electing me to a seat on that body. Whenever I have met him, he has always impressed me with his sterling qualities and he has certainly to-day proved them by the way in which he has ruled the meeting.

Mr. W. H. LITTLER (ex-member of Council).—As your guest to-day and not as a member of the Association I should like, if you will permit, to associate myself with the vote of thanks to your president, and in doing so I look back for nine or ten years, possibly for eleven, during which I have been backwards and forwards to these conferences. The presence of your president here to-day reminds me of the many excellent presidents who have presided over the meetings. My reason for rising now was partly to apologise for abandoning the Executive Council so quickly after the members had done me the honour last year of appointing me to it. But the explanation is that an accident took me out of public life. I am sorry to part with public life; I am sorry to be out of tramway work. But when I look back over 16 years of pretty strenuous effort and work, and on all the friendly associations connected with those years, no memories which I shall carry away with me will be more fragrant or sweeter than those of my membership with you as individual men in this Association. I wish the Association every prosperity; it has done excellent work in the past, and we of medium sized or small undertakings owe you a deep debt for the work you have done and the protection you have afforded us. I shall carry away with me the most pleasant memories of you both as individuals and as an organised body. I thank you for the many kindnesses I have received at all your hands. (Applause.)

The motion was adopted with acclamation.

The PRESIDENT.—I am very much obliged to you for the very kind words said on my behalf to-day by Alderman Linsley and Sir John Courtis, who have proposed and seconded the vote of thanks. I have felt very much the honour of being president of the Association, and although I have been a member of the Executive Council practically during the whole existence of the Association, this past year has brought me more in contact with the secretary, who has got his hand on the pulse of the tramway world. I have therefore more interest in the work which the Association is doing, and I have wondered what effect it would have if Corporations realised what the Municipal Tramways Association has done on behalf of municipal tramways. The Corporations have not the slightest idea of the number of important questions that have come before us during the last three or four years. Take as an example, the Lights (Vehicles) Order, 1915: now if that Order had been carried out in the form in which it was originally produced, it would have cost tramway undertakings more money to have equipped those cars and rewired them than would be paid in subscriptions to this Association by municipalities and in expenses of their representatives to our conferences in perpetuity. There is not the slightest doubt about it. If we had had to invest the money to carry out these alterations as originally proposed, the proceeds would have been sufficient to have paid municipal representatives' fees for an indefinite period. That is only one point. Scores of items constantly arise that are of great interest and importance to tramway operators, and a strong body like the Municipal Tramways Association is required to deal with them and to know what they are talking about. It is no use going before a Government department unless you know exactly what you want. However, perhaps I am wandering away from the point, which is to say how much I have enjoyed being president of this Association for the past year. Apart from the education it has been to me, it has been a great pleasure to meet such an amiable assembly of members. In a final word, allow me to thank you. (Applause.)

ANNUAL REPORT OF THE EXECUTIVE COUNCIL OF THE MUNICIPAL TRAMWAYS ASSOCIATION.

The report of the Executive Council on the work for the past year was as follows:—

ANNUAL CONFERENCE.

Having regard to the European crisis, the Council decided to hold business meetings in London in lieu of the Annual Conference, devoting one day entirely to the discussion of papers, and the second day to the ordinary Annual General Meeting.

NEW MEMBERS AND RESIGNATIONS.

The following have joined the Association during the year:—

Managers—

W. H. Ellis, traffic superintendent, Corporation Tramways, Chester.

G. F. Naylor, general manager and engineer, Corporation Tramways, Nelson.

P. Priestley, general manager, Corporation Tramways, Oldham.

C. O. Silvers, general manager and engineer, Corporation Tramways, Wolverhampton.

The following have retired from the Association during the year:—

J. W. Dugdale, late general manager, Corporation Tramways, Oldham.

Alderman J. H. Rodgers, (Member of Executive Council), late Chairman of the Newcastle Corporation Tramways Committee.

Alderman H. W. Littler (Member of Executive Council), late Chairman of the West Ham Corporation Tramways Committee.

The Council decided to leave the positions on the Executive Council vacant until the annual meeting.

The Council regret to record the deaths of Mr. W. A. Luntley, general manager of the Wolverhampton Corporation Tramways, and of Mr. J. Gardner, general manager of the Chester Corporation Tramways.

MEMBERSHIP.

Appended is a comparative summary of the members for the past four years.

	1912–13	1913–14	1914–15	1915–16
Honorary members ...	1	1	1	1
Local authorities ...	75	75	76	76
Managers and assistants	109	111	111	112

MEETINGS OF EXECUTIVE COUNCIL.

Since the last annual meeting the Council have held seven meetings, namely, at Sheffield (2), Leeds (3), Bradford, and Manchester.

INCOME TAX—ASSESSMENT OF MOTOR OMNIBUSES.

The Joint Committee comprising representatives of the undermentioned bodies—

The Municipal Tramways Association (Inc.),
The Institute of Municipal Treasurers and Accountants (Inc.),
The London Omnibus Owners' Federation,
The Provincial Omnibus Owners' Association (Inc.),
The Tramways and Light Railways Association,

have submitted a report, and furnished evidence respecting the operation of motor omnibuses to the Chief Inspector of Taxes, with a view to the adoption of a uniform method of determining depreciation allowances for income tax purposes.

The following comprises the committee of the M.T.A.:—Mr. P. Fisher (president), Mr. H. Mozley (vice-president), Messrs. J. Dalrymple, A. R. Fearnley, J. M. McElroy, and C. J. Spencer (hon. secretary).

Mr. J. M. McElroy (Manchester) and Mr. C. J. Spencer (hon. secretary) are the representatives of the Association on the Joint Committee dealing with this matter.

DEVELOPMENT OF THE ELECTRIC VEHICLE.

The following was the constitution of the committee between April 1, 1915, and March 31, 1916:—

Representing the Incorporated Municipal Electrical Association.—F. Ayton (engineer and manager, Ipswich Corporation Electric Supply and Tramways Department), J. W. Beauchamp (engineer and manager, West Ham Corporation Electric Supply), R. A. Chattock (city electrical engineer, Birmingham), A. C. Cramb (borough electrical engineer, Croydon—president, I.M.E.A.), J. Christie (engineer and manager, Brighton Corporation Electric Supply), J. E. Edgcombe (borough electrical engineer, Kingston-upon-Thames), H. Faraday Proctor (engineer and general manager, Electricity Department, City of Bristol—hon. sec., I.M.E.A.), A. H. Seabrook (manager, St. Marylebone Electric Supply).

Representing Commercial Motor Users' Association, Incorporated.—E. S. Shrapnell-Smith.

Representing Provincial Electric Supply Companies.—F. E. Gripper (managing director, Edmundson's Electricity Corporation, Limited, London).

Representing Electrical Contractors' Association.—W. R. Rawlings.

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Representing British Electrical and Allied Manufacturers' Association.—R. A. R Bolton (Siemens Brothers' Dynamo Works Company, Limited), A. R. Everest (British Thomson-Houston Company, Limited), E. S. New (D.P. Battery Company, Limited), C. C. Rattey (Electrical Power Storage Company, Limited).

Representing Incorporated Association of Electric Power Companies.—J. S. Highfield (chief engineer, Metropolitan Electric Supply Company, London).

Representing Makers of Electric Vehicles.—E. W. Curtis (managing director, General Vehicle Company, London), A. E. Meaden (Wolseley Motors, Limited), J. F. Monnot (Arrol-Johnston, Limited), P. A. Mossay (Ransomes, Sims and Jefferies, Limited).

Representing Edison Accumulators Limited, London.—W. H. L. Watson.

Representing the British Electrical Federation, Limited.—R. J. Howley.

Representing Chelsea Electricity Supply Company, Limited.—P. Still.

Representing Garage Proprietors.—G. H. Heath (Heath's Garage, Limited, Birmingham).

Representing the Institution of Municipal and County Engineers.—A. E. Collins (city engineer, Norwich).

Representing the Municipal Tramways Association (Incorporated).—A. R. Fearnley (general manager, Sheffield Corporation Tramways).

Representing the Tramways and Light Railways Association.—A. V. Mason (general manager, South Metropolitan Tramways and Lighting Company).

A number of meetings of this committee, whose main object is to encourage the development of the electric vehicle, have been held in London during the year, under the chairmanship of Mr. R. A. Chattock, Birmingham. Excellent progress seems to have been made in the standardisation of apparatus in connection with electric vehicles, particularly affecting lead acid accumulator plates, and charging plugs.

The committee have been in communication with representative electrical engineers in the Colonies, with a view to the British electric vehicle standards being adopted throughout the Empire.

Representation has been obtained on the tire and road wear Research Committee.

The Electric Vehicle Association of America having ceased to exist as a separate body, the committee are now affiliated with the Electrical Vehicle Section of the National Electric Light Association of America, which has a membership of about 14,000.

The full report of the committee for the year ending March 31, 1916, appears in the proceedings of the I.M.E.A.

Maintenance of Bridges.—Motor Traffic over Railway Bridges.

Apropos the decision in the Sharpness New Docks and Gloucester and Birmingham Navigation Company *v.* Attorney-General (at the relation of the Corporation of Worcester), which appeared in the last report of the Council, the following recent decision will be of interest to members :—

Attorney-General (on the Relation of Pickfords Limited) *v.* Great Northern Railway Company.

(Before the Lord Chancellor, Lord Loreham, Lord Haldane, Lord Shaw of Dunfermline, and Lord Sumner.)

Judgment was delivered in this appeal in the House of Lords on July 21 from a decision of the Court of Appeal, which reversed a decision of Mr. Justice Warrington. The main question at issue was as to the condition of strength in relation to traffic in which the respondents were bound to maintain a railway bridge built over a public highway under the powers of a special Act, which incorporated the Railways Clauses Consolidation Act, 1845. The bridge carried the highway leading from Hornsey Road to Crouch End across the Great Northern Railway, and it was completed in 1867. Since that time heavy motor traffic had become common on this highway. The appellant contended that the respondents were bound to maintain the bridge in a condition to support all traffic which might reasonably be expected from time to time to pass along the highway. The respondents, while admitting their liability to maintain the bridge, contended that their obligation was to be measured by the traffic which existed at the time when the bridge was made.

Mr. Justice Warrington gave judgment in favour of the appellant ; but the Court of Appeal (Lords Justices Swinfen Eady, Phillimore, and Bankes) reversed his decision, and held that the respondents were not bound to maintain a bridge stronger than that originally constructed.

The appeal was twice argued in the House of Lords.

Sir Robert Finlay, K.C., Mr. Ernest Charles, K.C., and Mr. W. A. Jowitt appeared for the appellant, and Mr. Tomlin, K.C., Mr. Vernon, and Mr. Andrews-Uthwatt for the respondents.

The Lord Chancellor said that the question raised was of unusual importance and in his opinion the judgment of the Court of Appeal was right, and this appeal should be dismissed with costs. Lord Loreburn, Lord Shaw of Dunfermline, and Lord Sumner gave judgment to the same effect, Lord Haldane alone dissenting.

Supply of Tramway Tickets.

The following Proclamation was issued in February, 1916 :—

" As from and after March 1, 1916, subject as hereinafter provided, the importation into the United Kingdom of the following goods is hereby prohibited, viz. : –

All materials for the manufacture of paper, including wood pulp, esparto grass, linen, and cotton rags.

Paper and cardboard (including strawboard, pasteboard, millboard, and wood pulp board), and manufactures of paper and cardboard.

All periodical publications, exceeding 16 pages in length, imported otherwise than in single copies through the post.

Tobacco, unmanufactured and manufactured (including cigars and cigarettes).

Furniture woods, hard woods, and veneers.

Stones and slates.

Provided always, and it is hereby declared, that nothing in this Proclamation shall apply to any goods of the description specified which are imported under licence given by or on behalf of the Board of Trade, and subject to the provisions and conditions of such licence."

The following gentlemen have been appointed on a Commission to grant licences for the importation of such quantity or such proportion of these goods as the Board of Trade may from time to time direct, and to arrange for the importation of this quantity or proportion and for the distribution of the imports among paper makers and paper users on such terms as may appear to the Commission to be equitable : –

The Right Hon. Sir Thomas Whittaker, M.P. (chairman) ; Sir Rowland Bailey, C.B., I.S.O., M.V.O.; George Brown, Esq.; W. Howard Hazell, Esq.; James Jeremiah, Esq.; Sir Frederick Macmillan, Kt.; Sir Walter Nugent, Bart., M.P.; Ernest Parke, Esq.; Oswald Partington, Esq., M.P.; Albert Reed, Esq.; The Right Hon. Sir Albert Spicer, Bart., M.P.; The Hon. John Singleton Clemons (secretary).

Negotiations have taken place between the Municipal Tramways Association and the Commission with the object of treating paper for tramway tickets as exceptional, but unfortunately the Commission were unable to make any exception in the case of a licence issued to manufacturers of tramway tickets, it being held that there is an adequate supply of paper for this purpose.

The restricted importation of wood pulp has meant a great increase in the cost of tramway tickets, and the future is by no means free from anxiety.

Election of President.

The Executive Council have given this matter careful consideration, and submit the following report :—

The Executive Council have taken into careful consideration the resolution referred to them by the annual meeting held in London in September, 1915, as under : –

" That the Executive Council take into consideration the advisability of, and report as to the steps to be taken in after years, for filling the position of president alternately by a committee and a managerial member."

In order to gain information on this matter inquiries have been addressed to the undermentioned associations and institutions, who have supplied details of their procedure :—Association of Municipal Corporations, Chief Constables' Association, County Councils' Association, Incorporated Society of Inspectors of Weights and Measures, Institution of Automobile Engineers, Institution of Civil Engineers, Institution of Municipal and County Engineers, Institution of Mechanical Engineers, Incorporated Municipal Electrical Associations, Institution of Electrical Engineers, Institution of Gas Engineers, Institution of Municipal Treasurers and Accountants, Institution of Water Engineers, Sanitary Inspectors' Association, Tramways and Light Railways Association.

The Council beg to tender to such associations and institutions their thanks for the information so fully and freely offered.

Unfortunately the information gleaned does not help the Council very much, as many of the bodies above referred to are purely professional, and consequently the question at issue does not apply to them.

The Executive Council consider that the election of the president should in all cases be based upon the principle that the gentleman proposed for the office should be one who, by common consent, has rendered such distinguished service to the tramway industry, either as a member of the association or otherwise, as obviously would entitle him to hold the high office of president of the Municipal Tramways Association.

If this principle be accepted it follows that the choice open to the association should be as wide as possible, and should not be restricted to any particular class of member. As, however, there appears to be a feeling that the election of president should alternate between the two classes of members, viz., committee and managerial members, the Executive Council feel that this practice might be followed, unless in any particular year circumstances arise in which it may be found desirable, in the interests of the association, to act otherwise.

It is suggested that certain alterations to the Articles of Association should be made in order to enable the association to appoint a chairman of the Executive Council, who need not necessarily be the president of the Association.

Signed on behalf of the Executive Council,

PETER FISHER, *President.*

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Tramway Tire Supplies during War Time.

In order to meet the difficulties encountered in obtaining supplies of tires a Joint Committee, comprising Mr. H. England, Mr. F. Bland, and Mr. J. B. Tippetts, representing the Tramways and Light Railways Association, and Mr. W. Clough (Bury), Mr. A. R. Fearnley (Sheffield), and Mr. C. J. Spencer (Bradford), representing the Municipal Tramways Association, have met in conference representatives of the leading firms of tire makers. It was felt that if tramway undertakings could arrange to standardise their tires, in order to reduce the number of sizes in use, the situation might be eased very considerably, and that possibly this step would favourably affect prices. Inquiries were made from the various tramways, both municipal and company controlled, as to the size of tires and quality used, and a tabulation of the information was prepared and submitted to the Joint Committee.

The Executive Council did not feel justified in recommending the acceptance of the terms agreed upon between the Tramways and Light Railways Association and the steel manufacturers.

Rail Corrugation.

Unfortunately the war has greatly interfered with the activity of this special committee, but notwithstanding the many difficulties the sub-committees have continued their experiments, and the Southern Section, under the chairmanship of Mr. W. Worby-Beaumont, M.Inst.C.E., have reported certain interesting observations in connection with their experiments on the London County Council Tramways.

Tramway Protective Clauses in Water Bills.

In the last session of Parliament protective clauses in favour of tramway undertakings were inserted for the first time in a Water Bill in respect of posts, mains, cables, and other apparatus. The Bill was promoted by the Metropolitan Water Board. It is to be hoped that the innovation will be followed in all similar Bills.

Retention of Tramway Employees.

The question of retention of indispensable tramway employees has had the careful consideration of the Executive Council, and in order that some definite policy might be adopted it was decided to seek an interview with the Reserved Occupations Committee with a view to getting certain indispensable classes of employees scheduled.

The following representatives attended a conference convened for this purpose :—On behalf of the Municipal Tramways Association (Inc.)—H. Mozley (vice-president), A. R. Fearnley (past president), C. J. Spencer (hon. secretary). On behalf of the Tramways and Light Railways Association—Mr. J. Devonshire. On behalf of the British Electrical Federation—Mr. R. J. Howley.

It was agreed at this conference that tramway undertakings were of great national importance, and ought to be able to retain certain indispensable sections of employees. The Reserved Occupations Committee recognised that tramways were essential to commerce, and that interference with their efficiency would have a serious effect both on the output of munitions and the commercial welfare of the country.

On May 1, 1916, the Government departments concerned certified, after consultation with the Army Council, that certain tramway employees may be considered as indispensable.

Munitions of War (Amendment) Act, 1916.

Tramway undertakings throughout the country have experienced considerable difficulty due to the enlistment of skilled men. The Minister of Munitions agreed on hearing representation on behalf of the Association to insert a clause in the Munitions of War (Amendment) Bill, 1916, extending the term "munition work'" to cover tramway facilities, in cases where such services were deemed of importance to the manufacture of munitions, and since the passing of the Act many undertakings have been certified as coming within its provisions, which impose certain restrictions and reservations upon employers and employees as to leaving certificates, etc.

The Council take this opportunity of recording their appreciation of the valuable advice and service freely given by the late Sir George Scott Robertson, K.C.S.I., M.P. (Member for Central Bradford), and Sir William Middlebrook, M.P. (Member for South Leeds) in connection with the above matter. In these negotiations the Association was closely in touch with the Association of Municipal Corporations, from whom every assistance was received.

The following special resolution was passed :—"That the Executive Council were impressed with the perseverance of the hon. secretary in carrying out this arrangement, and decided to record their appreciation of his efforts in securing recognition of tramway undertakings in connection with 'munitions work.'"

Classification of Tramway Material.

In order to ensure the prompt delivery of material required for the maintenance and repair of rolling stock and permanent way, the Ministry of Munitions agreed to classify such material in Class B, which arrangement has facilitated the delivery of the requisite material for this purpose.

Women as Tramcar Conductors.

In order to meet the stress of circumstances, tramway undertakings generally have adopted female labour in various capacities, and at the present time 8,433 women are employed as conductors and 176 women as drivers on municipal tramway undertakings.

In connection with the employment of women as tramcar conductors some difficulty arose in the Metropolitan area, due to the attitude of the Commissioner of Police in refusing to grant licences, and in accordance with the resolution passed at the last Annual General Meeting, representation was made to the Home Secretary on behalf of the members in that area with the object of removing the restrictions on the employment of women, and it was largely owing to the action taken by the Association that the Commissioner of Police subsequently modified his views and agreed to grant licences on application being made.

Disabled Soldiers and Sailors.

The following report of the National Service Committee of the Institution of Electrical Engineers on the subject of formulating some scheme whereby the Institution might be of some assistance in training and finding employment for disabled soldiers and sailors was considered by the Executive Council :—

The Institution of Electrical Engineers.

Report of the National Service Committee.

The committee have considered the following reference from the Council :—

"To consider and report to the Council on a letter from the president on the subject of forming some scheme whereby the Institution may be of assistance in finding employment for disabled soldiers and sailors."

The committee report as follows :—

(1) The committee consider that it is desirable to form such an organisation, and they recommend that letters be written to the electric supply undertakings and to manufacturers to ascertain whether they can employ disabled men who have received some sort of preliminary training in the duties of switchboard attendants.

(2) If a satisfactory response is received the committee recommend that they be empowered to consider the manner of arranging for the training of these men, obtaining means for carrying out the same, and selecting and distributing applicants for positions.

(3) The committee recommend also that the I.M.E.A., B.E.A.M.A., and other associations be informed of what the Institution is doing in the matter.

After full consideration the Council decided that, whilst having every possible sympathy with the objects named, they could not recommend the various municipal tramway undertakings to adopt the suggestion, in view of the fact that large numbers of tramway men had been granted leave of absence in order to serve with His Majesty's Forces, and their positions were being kept open for them. Tramway undertakings had already incurred a great obligation in this direction and were therefore reluctant to commit themselves further at the present time.

Lights (Vehicles) Order, 1915.

The Order of the Secretary of State dated December 15, 1915, framed under Regulation 2 of the Defence of the Realm (Consolidation) Regulations, 1914, as to lights on vehicles in places outside the Metropolitan and City of London Police Districts, provided (*inter alia*) as under :—

Part I.

(1) Every vehicle on any street, highway, or road to which the public have access in any part of England or Wales, excepting the Metropolitan and City of London Police Districts, between half an hour after sunset and half an hour before sunrise, must carry lamps as follows :—

(*a*) At the front, a lamp or lamps displaying to the front a white light. If only one lamp is carried for this purpose on any vehicle other than a bicycle, tricycle, or handcart, it must be placed on the extreme off, or right-hand side of the vehicle ; if a second lamp is carried it must be placed in the corresponding position on the extreme near, or left-hand side of the vehicle, and

(*b*) At the rear, a lamp displaying to the rear a red light. The lamp carried for this purpose on any vehicle other than a bicycle, tricycle, or handcart must be placed on the off or right-hand side of the vehicle.

The Executive Council were of opinion that when these regulations were drafted, the special circumstances of tramways had been overlooked, and it was pointed out to the Home Office that the provision of lights in the positions indicated would be a very difficult matter, especially in view of the shortage of staff, and further, that the installation of lamps on the extreme off side of a tramcar would be inviting danger.

As a result of representation to the Home Office, it was agreed that the above regulations should not apply to tramcars, and that the red light, as provided for in paragraph 1 of Part I., at the rear, need not be on the off side, and if two lights are carried at the front, one being on the off side, the second need not be on the extreme near side in a corresponding position to the light on the off side.

British Trade after the War.

The following resolution was passed by the Council of the I.M.E.A. respecting a report of a Sub-committee of the Advisory Committee to the Board of Trade on Commercial Intelligence as to measures

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for securing the position after the war of certain branches of British industry :—

I.M.E.A. Council, March 17, 1916.

"That the Council, whilst being anxious in every way to encourage British trade and the purchase of home manufactures, and being prepared heartily to support measures taken to this end by legislation or otherwise, view with deep concern Recommendation 6 (*b*) of the Sub-committee of the Advisory Committee of the Board of Trade to the effect that—'All Government departments, local authorities, and statutory bodies entrusted with the control of monies raised by taxes or rates, should be under legal obligation to purchase, so far as possible, only goods produced within the British Empire.'"

The Council agreed with the principle enunciated in the above resolution of the I.M.E.A.

MOTOR OMNIBUS TRAFFIC, ROAD MAINTENANCE, ETC.

No further action has been taken in this matter during the year, the whole subject being in suspense until after the war. The attention of members is drawn to the following special legislation enacted during the year, which vitally affects municipal tramways :—

Local Government (Emergency Provisions) Act, 1916.

Prohibition for the Establishment of New Routes for Omnibuses.

20. (1) Notwithstanding anything in any statute it shall not be lawful after the passing of this Act for any omnibus to ply for hire on or use any route which has not been regularly used by omnibuses plying for hire within two years prior to March 1, 1916, except with the consent of the highway authority or, if more than one, every highway authority liable for the maintenance and repair of the highways along which the route runs, which consent may be given on such conditions as the highway authority may consider fit, or, if in the opinion of the Local Government Board such consent is unreasonably refused, or if such conditions are unreasonable, without the consent of the Local Government Board ; and if any person drives an omnibus or allows an omnibus to be driven along any route in contravention of this provision, he shall, on summary conviction, be liable to a fine not exceeding £5 and to a further penalty not exceeding 40s. for every mile travelled by every omnibus in contravention of the provisions of this section, all penalties recoverable under this section to be paid into the funds of the highway authority concerned.

Provided that nothing in this section shall apply where a route is altered in consequence of the temporary diversion of traffic on account of the breaking up of any road or in pursuance of the directions of any police authority or other directions lawfully given.

Provided also that nothing in this section shall apply to any omnibus plying for hire on or using any route in any case where the Admiralty, Army Council, or Minister of Munitions are of opinion that an omnibus service is necessary for and is to be used by munition workers or other persons engaged on Government war service.

(2) This section shall not be deemed to detract from any existing powers of highway authorities in regard to omnibuses.

(3) For the purposes of this section the expression "omnibus" includes every omnibus, chars-a-banc, wagonette, brake, stage coach, or other carriage plying for hire or used to carry passengers at separate fares.

It has been noted that certain action is being taken by the County Councils' Association under these powers. The Council is watching this, and if anything arises will take steps to safeguard the interests of the Association, as far as possible.

STANDARDISATION OF TRAMWAY RAILS, TIRES, AXLES, AND SPRINGS.

The Sub-committees of the Engineering Standards Committee dealing with these matters having had no meetings during the year, the Council representatives have nothing to report.

The Council regret to note the tragic death of Mr. Leslie S. Robertson, secretary of the Engineering Standards Committee, who accompanied Lord Kitchener on H.M.S. *Hampshire*. Mr. Robertson has been the secretary to the Standards Committee since its formation, and in that capacity has rendered invaluable service to the engineering profession. His unfailing courtesy and urbanity endeared him to all those with whom he came in contact, and the Council, as representing one engineering branch, feel that they have lost a most able friend.

MEETING OF MANAGERS' SECTION.

In accordance with the resolution passed at the meeting of the Managers' Section at the last Annual Conference in London, the Council considered this matter early in the year and decided, in view of the extraordinary circumstances still prevailing, to abandon the Half-yearly Spring Meeting this year.

TRAMWAYS AND LIGHT RAILWAYS ASSOCIATION CONGRESS.

The Tramways and Light Railways Association very kindly extended invitations for representatives to attend their Annual Congress in London, but unfortunately pressure of business prevented their attendance.

FINANCE.

The Council have to report that the finances of the Association are in a satisfactory state.

By order of the Executive Council,

PETER FISHER, *President.*
C. J. SPENCER, *Hon. Secretary.*

FINANCIAL REPORTS AND MEETINGS.

Kalgoorlie Electric Tramways Company.—The accounts for 1915 show that after charging £4,000 for depreciation, and £9,206 for debenture interest, the adverse balance of £12,520 brought forward has increased to £18,520.

W. T. Henley's Telegraph Works Company announce an interim dividend on the preference shares at the rate of 4½ per cent. per annum, less income-tax, and on the ordinary shares at the rate of 10 per cent. per annum, less income-tax, for the half-year ending June 30 last.

Silverton Tramways.—The report for the half-year to June 30 states that the revenue amounted to £57,219, and, adding £24,000 transferred from reserve No. 2 and £30,902 brought in, the total is £112,121. After deducting expenses and income and other taxes, dividends amounting to £50,000 are declared, carrying forward £27,805.

Hong-Kong Tramways.—The report for 1915 shows a net profit, after writing £6,625 off for depreciation, and including £6,897 brought forward, of £18,071. A dividend of 12 per cent. has been declared, and a further £2,000 has been written off the cost of the undertaking, leaving £6,321 to be carried forward. The net profit has increased from £9,500 to £11,200, while the dividend is 2 per-cent. more than in 1914, and within ½ per cent. of the rate paid for 1913.

Dumbarton Burgh and County Tramways.—At the annual meeting, Mr. George Balfour, who presided, said the total receipts for the year amounted to £26,041, being an increase of £2,737. Expenses had increased by £2,052, the increased expense being distributed as follows :—Traffic expenses, £844 ; general expenses, £148 ; repairs and maintenance, £722 ; electricity supply, £338. The increased expenses were entirely due to abnormal cost of material and labour, but the net profit available for distribution was increased by upwards of £700 compared with the preceding year. The following dividends were declared :—On the preference shares at the rate of 6 per cent. per annum for the half-year to July 31, and on the ordinary shares of 1½ per cent. for the year, in each case under deduction of income-tax.

Montreal Tramways Company.—For the year ended June 30 last this company paid a dividend of 10 per cent., as compared with 7½ for the year 1912-13. The gross earnings increased by $84,533. There was a decrease of $6,943 in expenses of operation. The net gain was $91,477, or equal to 3¼ per cent. The expense ratio to gross earnings declined by nearly 1 per cent., to 56 per cent. After providing for the dividend of 10 per cent. on the larger amount of capital there is a surplus of $185,126, or $60,500 higher than for the preceding year ; $313,576 was debited to the contingent renewals account. The company has been included in the Treasury list of dollar securities that the Government are controlling by borrowing or purchase. Holders who deposit their securities gain ½ per cent. more interest.

Aberdeen Suburban Tramways Company.—At the half-yearly meeting, Mr. J. Mearns (chairman) said that the net profit was less than the corresponding period of the previous year. Revenue was slightly greater, but wages, maintenance, and road repairs had gone up, and the materials they required were almost unprocurable. The balance, amounting to £3,209, the directors proposed to apply as follows :—£1,200 to renewal and depreciation account, which would then stand at £16,700 ; a dividend at the rate of 5 per cent. for the past year on the paid-up capital, £1,562 ; directors' fees, £31 ; leaving to be carried forward, £415. Since the inception of the company the directors had set aside sums varying from £1,000 to £1,500 per annum in building up a reserve fund, which now stood at £16,700, or more than half the subscribed capital. £4,594 was last year paid by the company to the Corporation after deducting £1,992 allowed for traffic expenses and general charges. The system would, if ever amalgamated with the Corporation lines, be a profitable purchase for the city.

National Electric Construction Company, Limited.—In their report for the past year the directors state that the working of the various undertakings resulted in a loss of £3,650, after providing £3,750 for debenture interest and £1,550 for debenture redemption. The profit on contracts completed and in progress was £2,652, against £4,324, and the revenue from investments decreased, such revenue (less interest paid) being £3,392 against £4,386. There was a loss of over £2,000 in connection with an accident on the Dewsbury and Ossett tramway undertaking in October last. (The accident was due to a car getting beyond control on a descent, leaving the rails and damaging a building.) Half of the loss is apportioned to the present accounts. The board add that but for this accident the profit from the Dewsbury, Ossett and Soothill Nether Tramways would have been a record. In the case of several of the undertakings in which the company is interested, particularly those at Rhondda, Mexborough, Swinton, and Muselburgh, the shortage of labour has been acute. The price of fuel and of materials required for repairs has increased enormously.

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Bombay Tramways and Electric Supply Company.—At the annual meeting, held at Bombay, Sir Sassoon David presided. In moving the adoption of the report, the chairman said this was the first occasion that the general meeting of the company had been held in India. Notwithstanding the serious handicap of the war, both the gross and net revenue of the undertaking had continued on the upward grade. For the year under review, as compared with the previous year, the former recorded an advance of Rs. 1,23,000. and the latter an advance of Rs. 1,66,400. This comparison was with a year seven months of which were prior to the war. If they compared the same figures with the year 1913, a year of peace, then the increase in net earnings amounted to not less than Rs. 3,46,600. These figures were testimony to the soundness of the business, and to the care and prudence with which it was administered. After meeting all fixed charges, and defraying all the operating expenses and maintenance charges, and making the appropriations to various funds, the balance of net profit justified them in recommending a dividend at the rate of 7 per cent. per annum on the ordinary shares. This would leave £9,602 to be carried forward to this year's revenue as against a sum of £8,326 brought in last year.

United Electric Car Company.—The report for the year ended June 30 shows that, after charging £5,228 for depreciation (including £4,500 added to reserve), the profit is £6,562, to which has to be added £4,707 brought forward. After deducting £6,000 for the preference dividend in each half-year, £5,270 is carried forward. At the annual meeting on September 20, Mr. Robert B. Barningham (chairman) moved the adoption of the report. He stated that throughout the year the works had not been employed at anything like their full capacity. The orders for cars in progress twelve months ago had all been completed and delivered, and very few orders for tramcars had been received during the year. Corporations at home were holding back their orders at the present time, and foreign trade they could hardly expect. The directors had obtained all the Government work they could get, but there was not much chance for the company to share in large profits. They had had a fair share of Government work in motor and general service wagons and pontoons. He had good hopes that the company would be ultimately paid for the cars they had delivered, chiefly in South America, but one could not say how the purchasers, who were chiefly in occupied territory in Belgium, would come out of it all. He was satisfied that when hostilities ceased there would be plenty of work both at home and abroad, as the great bulk of the cars had been running many years and must be renewed. The meeting re elected Messrs. R. H. Prestwich and the chairman as directors.

Salford Corporation Tramways.—Mr. G. W. Holford's annual report to the Tramways Committee is summarised in its financial aspect in the appended table, which also gives the corresponding figures for the two preceding years. Of the 75¾ miles of tramways worked by the corporation, 36¾ miles are owned by the authority, the remainder being lines leased by surrounding towns and lines in Manchester and Worsley over which running powers are granted, while 2½ miles in Trafford Park are worked jointly with Manchester Corporation. A record number of passengers were carried, the figure being 56,458,266, an increase of 2,114,358 on 1915, the previous best. The earnings per car-mile were 11·853d., the highest on record, but owing to the depleted staff the car mileage was only 5,495,295, as against 5,828,232 in 1914-15 and 6,235,278 in 1913-14. In order to permit of the payment of £22,000 in relief of the rates, £3,526 has been transferred to the current account from the depreciation and renewals fund. The balance remaining in the depreciation fund is £21,266. From the commencement of the undertaking £107,713 has been paid into this fund, of which £86,446 has been expended.

	1916-15.	1915-14.	1914-13.
Capital expenditure	£752,263	£725,485	£723,923
Amount outstanding	£501,285	£511,853	£532,821
Traffic revenue	£271,403	£257,935	£272,758
Total revenue	£271,554	£257,977	£272,812
Working expenses	£169,916	£170,521	£178,770
War allowances	£13,136	£6,227	—
Gross balance	£88,502	£81,229	£94,042
Net profit	£22,000	£34,265	£22,000
Passengers carried	56,458,266	54,343,908	53,124,546
Fare per passenger	1·149d.	1·134d.	1·227d.
Car mileage	5,495,295	5,828,238	6,235,278
Units per car-mile	1·793	1·667	1·606
Power cost per car-mile ...	2·172d.	2·050d.	1·936d.
Traffic receipts per track-mile	£3,580	£3,403	£3,646
Traffic receipts per car-mile ...	11·853d.	10·622d.	10·499d.
Expenses per car-mile ...	7·420d.	7·022d.	6·881d.
Ratio of working expenses ...	62%	66%	65%
Total track mileage	75m. 64c.	75m. 64c.	75m. 64c.
Number of cars in stock ...	210	200	200

Bradford Corporation Tramways.—Subjoined will be found the chief items in the accounts for the year ended March 31, 1916, and also for the two preceding years. In his 18th annual report to the Tramways Committee, Mr. C. J. Spencer, general manager, observes that this first complete year under war conditions brought an ever increasing stress of circumstances. Traffic revenue (excluding railless) increased by £9,480, and notwithstanding a decrease of 316,865 in the car mileage, or 5 per cent., the revenue increased 3·8 per cent., which was about the usual normal yearly increase. Despite this increase in the expenditure, the net growth of revenue was £6,836. A closer examination of the year's trading, the manager says, is not so reassuring. Expenditure per car-mile had risen to the record figure of 9·109d., and had the receipts been the same per car-mile as the average of the previous five years, there would have been a loss of nearly ½d. per car-mile, representing a sum of £12,900. The higher costs in the main might be allocated to the increased costs of labour, material, and power. The cost of labour had risen to 40 per cent. of the total income and 54 per cent. of the total expenditure. Mr. Spencer points out that there is no real economy in the decrease of £2,000 in the cost of permanent way maintenance and of £3,261 in the cost of car repairs. These decreases were due to shortage of labour, which had led to 20 cars being entirely withdrawn from service as unsafe for public operation. While the cost of operation, apart from financial charges, had reached a record figure, the average fare per passenger was at a record low figure of 1·047d., or 1·13 per cent. lower than last year and 10 per cent. lower than 1910-11.

	1916-15.	1915-14.	1914-13.
Capital expenditure	£1,043,135	£1,043,054	£1,040,118
Amount outstanding	£590,988	£634,618	£653,504
Traffic revenue	£314,486	£309,321	£298,525
Total revenue	£341,624	£329,888	£317,133
Working expenses	£246,613	£243,312	£231,151
War allowances	£8,338	£2,784	—
Gross balance	£86,673	£83,792	£85,982
Net profit	£29,771	£32,442	£29,447
Passengers carried	74,082,612	70,077,271	67,675,166
Fare per passenger	1·047d.	1·059d.	1·058d.
Car mileage	5,877,192	6,194,057	6,206,239
Units per car-mile	1·990	1·900	1·894
Power cost per car-mile ...	2·165d.	2·027d.	1·948d.
Traffic receipts per track-mile	£2,892	£2,807	£2,793
Traffic receipts per car-mile ...	12·842d.	11·816d.	11·486d.
Expenses per car-mile ...	9·450d.	8·774d.	8·376d.
Ratio of working expenses ...	74·630%	74·600%	73·138%
Total track mileage	118m. 15ch.	118m. 9ch.	106m. 29ch.
Number of cars in stock ...	236	252	245

CONTRACTS AND ORDERS.

Walsall Tramways Committee have accepted the tender of J. Parkinson and Son to supply a lathe, etc.

Salford Council have ordered a steam recorder from the Lea Recorder Company, and a feed-water heater from Royles, Limited.

E. Green and Son, Limited, have received an order for an economiser and accessories to be supplied to Wakefield electricity works.

Aberdeen Tramways Committee have placed a contract with the British Thomson-Houston Company for the supply of two traction motors.

West Hartlepool Council have placed an order with the New Conveyor Company for a coal and ash conveyor at the extension of the electricity works that is about to be erected.

Hadfields, Limited, have received a contract from Salford Tramways Committee for the supply of manganese steel crossings, required for renewing the tramway junction at Lower Broughton Road.

Walthamstow Council have allotted contracts as follow:—British Thomson-Houston Company, extra high-tension switchgear; General Electric Company, low-tension switchgear; Bruce Peebles and Company, motor converter.

Hawthorn (Victoria) Tramways Trust have placed the following contracts:—Australian General Electric Company and British Westinghouse Company, motor equipment; Horrocks and Roxburgh, Limited, crossovers; Messrs. Duncan and Fraser, 15 car bodies.

Belfast Tramways Committee have decided to replace eight mechanical stokers in the electricity station by four of an improved pattern, thus greatly increasing the efficiency of the station. An order has been given to Messrs. Babcock and Wilcox for four chain grate stokers, at £1,870.

Shepherd's Parging Block Company, Limited, of Rochdale, have received an order from the borough engineer of Rotherham for block parging to be fixed in connection with the new track work on the extension of the Rotherham Corporation Tramways, and from Haslingden Council for the tramways in that borough.

Manchester Tramways Committee has allotted the following contracts:—F. Smith and Company, Limited, copper trolley wire; J. Waddington and Company, indigo blue serge; W. Lupton and

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Company, indigo blue pilot; N. Hope and Son, drivers', etc., timekeepers' and traffic inspectors' cloth caps; W. Walsh and Son, timekeepers' straw caps; C. Dillingham and Sons, drivers', guards' and point boys' straw caps; G. Cadwell and Company, women guards' straw hats; Briggs, Jones and Gibson, Limited, making-up uniform clothing.

Portsmouth Tramways Committee have allotted contracts for supplies as appended:—British Thomson-Houston Company, incandescent lamps; British Westinghouse Company, fibre sheet and mica; W. Atkins and Company, tool steel and files and rasps; Pilkington Brothers, car side and end glasses and sheet glass; T. H. Harvey, creosote oil and pitch; J. L. Duguid and Company, metal polish; Engelbert and Company, motor gear grease; W. B. Dick and Company, motor bearing, engine, cylinder, and cleaning oils; Fleming, Birkby and Goodall, crossovers, terminal clamps, splicing ears, etc., and trolley wheel bushes; F. Smith and Company, span and guard wire; Engineering Supplies Company, plain ears, frogs, and span section insulators and controller angers; Gabriel and Company, brake ratchets and lifeguard springs; F. W. Rowlands and Company, car gear wheels and pinions; West Bromwich Spring Company, springs and spring washers; Wm. Brunton and Son, armature binding wire; Smith Brothers and Hill, sand tubes, spring washers, motor springs, etc.; Anti-Attrition Metal Company, bushed and unbushed trolley wheels, axle box bearings, and key plates; Brommell Patents Company.

PERSONAL.

Sir Charles Parsons has been elected president of the British Association for 1917.

Mr. C. Ormrod, chief clerk, Bolton Corporation Tramways, has been appointed chief traffic assistant.

Mr. H. S. Ellis, borough electrical engineer at South Shields, has been voted an addition of £50 to his annual salary of £450.

Sir John Corke, a former chairman of Portsmouth Tramways Committee, has been selected as Mayor for the fifth year in succession.

Mr. E. Grimes, station engineer of Hackney Electricity Works, has been appointed superintendent of the Barking Council's power-station.

Mr. Algernon Law, C.B., Controller of Commercial and Consular Affairs at the Foreign Office, has been given the dignity of Knight-Commander of the Order of St. Michael and St. George.

Mr. G. H. Anger, managing director of the Anger Manufacturing and Supply Company, Limited, of Preston, Lancs., sailed for New York on October 3 on a business trip to the United States.

The Hon. Elaine Jenkins, the younger daughter of the late Lord Glantawe, has been elected chairman of Swansea and Mumbles Railway Company, after serving the company as a director for some time.

Sir Robert Hadfield contributed an article to the "Business and Organisation" columns of a daily contemporary in support of railway nationalisation from the point of view of promoting British trade.

Miss Jessie B. Hamilton, second daughter of Mr. J. B. Hamilton, commercial manager to Leeds Corporation, and Mrs. Hamilton, was married on September 15 to Lieutenant Somerville, of the Scottish Rifles.

Mr. George Balfour, of Messrs. Balfour, Beatty and Company, Limited, is one of the new directors added to the board of the Metropolitan Electric Supply Company, on the suggestion of the shareholders' committee.

Mr. S. Y. Maling, on leaving the electrical department of Melbourne Corporation to become deputy manager of the Sydney electric supply undertaking, has been presented with several gifts by the Melbourne staff and employees.

Conductor M. Smith, Dublin United Tramways Company, while passing Mount Bridge, heard a splash in the canal, and noticed a boy in the water. Leaving his car, he jumped in and brought the lad ashore. This is the second occasion on which he has saved life.

Mr. H. E. Duke, Chief Secretary for Ireland, has resigned the chairmanship of the Board of Referees, appointed to hear appeals under the excess profits tax provisions of the Finance Bill, and will be succeeded by Sir Charles B. Renshaw, chairman of the Caledonian Railway Company.

G.E.C. Directorate.—New directors of the General Electric Company are Messrs. M. F. Armstrong, G. H. Ide, and M. Solomon. Mr. Ide, who is manager of the metal works, has been with the company for twenty years, while Mr. Solomon, manager of the carbon works, has seen upwards of fourteen years' service.

British Thomson-Houston Directorate.—At a recent board meeting of the British Thomson-Houston Company, Ltd., Mr. J. F. Nauheim retired from the chairmanship as from September 30. The managing director, Mr. H. C. Levis, was appointed chairman of the board, and he also retains the managing directorship of the company.

Sir Sassoon David was re-elected a director of the Bombay Tramways Company at the first annual meeting held in Bombay since the removal of the offices from London. Mr. A. H. Froom was also re-elected, and Mr. F. C. Rimington, managing director, was given a seat on the board during the period he remains in India.

Mr. A. Nichols Moore, borough electrical engineer of Newport, Mon., has been requested by the Board of Management to a national shell factory to act in an advisory capacity to the board, and also to supervise the electrical equipment. The Council, acting upon the recommendation of the Electricity and Tramways Committee, have permitted him to take up these duties.

Mr. R. B. Leach was presented with a smoker's outfit by the staff of Heywood Corporation Tramways and Electricity Department on the occasion of his departure to take up the duties of electrical engineer and manager to Loughborough Council. Accompanying the gift was an address in which the contributors expressed their appreciation of the kindness that Mr. Leach had shown to the staff during his three and a half years' service as manager and engineer.

Mr. D. H. Davies, chief electrical assistant of the Stockton-on-Tees electricity undertaking, has been appointed electrical engineer and tramways manager to Heywood Corporation in succession to Mr. R. E. Leach, who has been appointed electrical engineer at Loughborough. Mr. Davies, who is 35 years of age, has been at Stockton five years, and he has also served at Darlington, Bury, and Manchester. The salary is £200 per annum, and there were fifty applications.

Mr. A. L. C. Fell, chief officer of the London County Council Tramways, has, we regret to state, suffered a relapse after the illness that overtook him early in the year. His medical adviser has ordered him to undertake a six months' tour. The unwelcome news of Mr. Fell's relapse was received with great regret at the annual conference of the Municipal Tramways Association, and a resolution of sympathy was passed coupled with an expression of hope that Mr. Fell would return with renewed vigour. Prior to his illness Mr. Fell and his wife entertained convalescent colonial soldiers at their residence.

Melbourne Tramways Board.—The Board appointed by the Government of Victoria under the temporary Act for taking over the undertaking of the Melbourne Tramways and Omnibus Company comprises Mr. C. Templeton (chairman), Sir David Hennessy, and Sir Henry Weedon (Melbourne City Council), Mr. A. Renfrew (Fitzroy Council), and Mr. F. T. Hickford (Brunswick Council). The Act will remain in force until December 31, 1917, unless an agreement is meanwhile arrived at between the Government and the several municipalities for the constitution of a single authority to control all the city and suburban tramways.

Mr. A. T. Lambert, general manager and electrical engineer, Maidstone Corporation Tramways, was accorded a vote of thanks at the September meeting of the Council "for the great services he has rendered to the undertaking to bring it to its present satisfactory financial position." The Council also expressed the opinion that had not the war arisen the year's trading would have been free from loss. The report presented by the Tramways Committee showed that the deficit had fallen from £2,484 in 1910 to £450, although the charge for energy was 22 per cent. above the sum paid in 1914-15. The Council also expressed their thanks to Councillor D. T. J. Lile, the chairman of the committee, who in reply said it was a great satisfaction to know that the undertaking was on the way to becoming remunerative.

Mr. Louis Slattery, who for the past five and a half years has been traffic assistant to the chief officer of the London County Council Tramways, was on September 26 appointed general manager of West Ham Corporation Tramways. Mr. Slattery began his career as assistant to the general manager at Blackburn in 1891. In 1896 he became general manager to the Blackpool, St. Annes and Lytham Tramways Company, a position which he occupied for several years before being selected to manage the Oldham Corporation Tramways, where he served for six years. Thirty-one applications were received for the vacancy created at West Ham by the removal of Mr. Moffet to Belfast, and seven candidates were interviewed. Ultimately the number was reduced to two, namely, Mr. Slattery and Mr. W. Clough, general manager at Bury. The initial salary is £600 per annum.

Mr. J. S. D. Moffet, who on October 1 took over the general management of Belfast Corporation Tramways, was entertained to dinner at the Municipal and County Club, Whitehall, S.W., on September 15, by the Metropolitan Association of Electric Tramway Managers. Among those present were Messrs. W. C. Ullmann (East Ham), chairman of the Association, F. Schofield (Leyton), vice-chairman, Messrs. J. K. Bruce (London County Council), L. E. Harvey (Ilford), W. E. Hammond (M.E.T.), J. B. Mackinnon (L.U.T.), T. B. Goodyer (Croydon), hon. secretary, H. W. Littler (ex-chairman West Ham Corporation Tramways), H. E. Blain

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(London General Omnibus Company), and W. T. Robson (Southampton). Letters expressing regret for inability to attend were received from Messrs. A. L. C. Fell and L. Slattery (London County Council), J. C. Williams (Erith), W. Murray (Walthamstow), and A. V. Mason (South Metropolitan).

Mr. James MacMahon, general manager of the Colombo Tramways and Lighting Company, Limited, died at Colombo on September 14.

WITH THE FORCES.

Sergeant J. Neary, who enlisted in the East Lancashire Regiment from Salford Corporation Tramways, has gained the Military Medal.

Corporal W. Harley, King's Royal Rifles, who has been awarded the Military Medal, was an employee on the Manchester Corporation Tramways.

Corporal J. W. Richardson, West Yorkshire Regiment, a member of the staff of York Corporation electricity works, has been awarded the Military Medal.

Quartermaster-Sergeant G. Kendall, R.F.A., who enlisted from the position of manager of Reading Corporation tramways parcels office, has been wounded in France.

Sergeant R. M. Bishop, who enlisted from the offices of Siemens Bros.' Dynamo Works, London, has been awarded the Military Medal for gallant conduct at Pozières.

Captain H. C. Sparks has received the French military award of the Croix de Guerre for the act of conspicuous gallantry performed by him on July 2, for which he had been awarded the D.S.O.

Mr. H. W. Leonard, who for the past six years has held an important position in the General Electric Company's publicity department, has recently joined the London Electrical Engineers.

Mr. J. M. Stephens, manager of the wiring supplies department of the British Thomson-Houston Company, has joined the Royal Flying Corps as Second Lieutenant, and will act as an assistant equipment officer.

Captain J. M. Donaldson, King's Royal Rifle Corps, who has been three times wounded since January, 1916, is an electrical engineer who was formerly with the British Thomson-Houston Company. He is now residing at Croydon.

Bombardier A. E. Ellis, R.F.A., who has been awarded the D.C.M. for repairing telephone wires in seventeen places under heavy shell fire, enlisted from the staff of the India-rubber, Gutta-percha, and Telegraph Works Company, Silvertown, London, in October, 1914.

Captain S. W. Carty, late of the electrical department of the Liverpool Corporation Tramways, has recently returned from the Soudan. He was in charge of the motor transport supply column of the force that operated against the Sultan of Darfur. He was promoted captain for his services, and thanked by the Sirdar.

TRAMWAY AND LIGHT RAILWAY NOTES.

BARROW-IN-FURNESS.

TRACK DOUBLING—TRAILER CAR PROJECT—GROWTH OF TRAFFIC.

Acceleration of the local tramway service has been effected since the completion of the doubling of the track in Abbey Road, and the Thermit welding of the old rails. In order to provide for the increased traffic since the outbreak of war, Mr. W. F. Bladon, the local manager, has secured two cars from another company, and he hopes to put two trailers into service. Plans have been prepared for an enlargement of the depot. Since the opening of the tramways in 1904 the number of cars has increased from a dozen to twenty-six. There are few towns where the conditions make it so difficult to secure regularity of service. The lines pass over two lifting bridges, and on the route there are seven level crossings.

BIRMINGHAM.

EXTENSION OF TIME FOR NEW TRAMWAYS—ANOTHER POWER FAILURE DUE TO INFERIOR COAL.

Birmingham Corporation have applied for an extension until September, 1917, of the periods limited by the Corporation's Light Railway Orders of 1912 and 1913 for the completion of the works authorised therein. For the fourth time during the past year there was an interruption of tramway traffic on September 19 on all the routes except a part of Aston and Erdington, which is worked from the Aston station. The cars were at a standstill between 10 a.m. and 11.30 a.m. Owing to the poor heating capability of much of the coal in use at the Summer Lane station, and the effect of the heavy rain on the outdoor stock, it was found to be impossible to maintain the full pressure of steam. To preserve the supply of energy to the munition works the tramway load was cut off.

BLACKPOOL.

LIFTING JACKS FOR CARS.

Blackpool Corporation Tramways Committee have purchased twelve jacks for use in lifting a car in the event of a pedestrian being run over and passing behind the lifeguard. The jacks will be housed at positions near the busiest centres.

BRADFORD.

THE COMPULSORY QUEUE—WOMEN CONDUCTORS—FREE RIDING.

In his annual report to the Tramways Committee, Mr. C. J. Spencer, the general manager, records that the Watch Committee had obtained the approval of the Board of Trade to regulations governing the access to and method of exit from tramcars at stopping places, and for controlling persons resorting thereto. The adoption of these regulations means that the police have full power to deal with persons failing to observe the queue system of loading tramcars. The gradients on tramway routes in the city caused anxious consideration before the Tramways Committee agreed in December last to employ women to act as conductors until sufficient male labour could again be obtained. At the end of the financial year on March 31 last 49 women were employed. Mr. Spencer states that the experience with them has been satisfactory, and that every praise is due to them for having by their pluck and patriotism assisted in a time of great emergency and stress. No women from the textile trades are accepted as conductors. Free conveyance was given on the Bradford cars during the past year to 443,230 persons, the value of the rides being £2,770. The participants were the military (including wounded convalescents), the Lord Mayor's Relief Committee, and the Belgian refugees.

BRISTOL.

EXTENSION OF THE OPTION TO PURCHASE THE TRAMWAYS.

In response to the application of the Tramways Option Committee the Board of Trade have again extended the period during which the Corporation of Bristol may exercise their option of purchase of the tramways company's undertaking. The extension is for one year, to October, 1917.

DARLINGTON.

SEATS FOR WOMEN CONDUCTORS.

After the trial of an experimental seat on the platform of one of the cars, Darlington Tramways Committee have decided to have others fixed. The women have stated that they feel a great strain in being called upon to stand for a long number of hours.

DUNDEE.

NEW METHOD OF RESTRICTING CAR LIGHTING—UNUSED RAILLESS TROLLEY CARS—ADDITIONAL POWER PLANT—TRACK RENEWALS.

As the result of visits that Mr. Fisher, the tramways manager, has paid to several English cities, he has brought to the attention of the military commander the system of shading and reducing the candle-power of the lights adopted on the Leeds tramcars, thus avoiding painting the windows. Provided that the light is subdued a little more, the authorities have agreed to the Leeds method being adopted in Dundee. Hitherto the windows of the cars have been obscured to within a few inches of the base. We observe from the annual report of the Tramways Committee that the department retains the two railless trolley cars that were used on the Clepington Road route, which was opened in September, 1912. The service was withdrawn in consequence of the disinclination of the Corporation to put the road surface in a suitable condition. The electricity committee have recommended that application be made for sanction to borrow £27,000 for the purpose of laying down additional plant, etc. The general manager has reported to the Tramways Committee that seven miles of single track will need renewal after the war, at a cost of about £30,000. Some portion of the work is urgent in character.

EDINBURGH.

THE TRAMWAYS PROBLEM—EMPLOYEES' WAR DISTINCTIONS.

The further report of Messrs. J. B. Hamilton, J. A. Brodie, and A. H. Campbell on the methods of traction that could be adopted for the tramways in view of the expiration of the company's lease was presented to the Edinburgh Corporation on October 4. The report recommends the overhead trolley system, which the consultants state could be running six hours after midnight on June 30, 1919, without the city having received any facilities from the company. For Princes Street the experts advise that overhead wires should be installed on the south side, where they would be largely hidden by trees. If after experience of that the citizens decide against it, the overhead can be taken down and the conduit introduced. In the event of the feared disagreement between the Tramways Company and the Corporation on the subject of repairs to the tramways, arbitration is likely to be sought. Sir Alex. Kennedy is mentioned as the arbitrator who would be appointed. Among the tramway company's employees three men have been awarded the D.C.M., all in different fields of war. One of the cases was that of a conductor who won the medal at Gallipoli, another of the recipients was a driver, and the third was a trackman. Five hundred of the 1,200 pre-war employees have joined the colours. Nearly thirty have lost their lives. The company is still continuing their policy of making an allowance to their men who entered the national services.

GLASGOW.

LIGHTING RESTRICTION RELAXED—THE COMMON GOOD FUND.

An improvement is being made in the method of darkening the tramcars at Glasgow, where the windows are obscured by colouring.

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Drivers have mistaken the routes in suburban districts, and passengers have been injured through stepping off before the cars reach their destination. In consideration of the ease with which the entire illumination can be extinguished at the generating station, the authorities have allowed the cars to show more light. During the past financial year the tramways department, and, incidentally, the national war cause, received some advantage from the Common Good Fund of the Glasgow Corporation. Hitherto the department has stood in the position of building up the fund with grants from the surplus profits of the tramways. In the past twelve months the fund contributed £7,328 for the raising of the Tramways and other City Battalions for service in the war. At the Corporation's budget meeting, Treasurer McMulan, referring to the accounts of the Common Good, said that the previous year there was a deficit of £62,000. They only got some £12,000 or £13,000 from the tramways. This year the tramways had provided a surplus of £43,548 to the Common Good, still leaving the working of the Common Good for this year with a deficit of £10,078. The first duty of the Corporation—and he hoped the tramways would assist—was to pile up a strong Common Good, so that they might be in a position to help those who required help.

LEEDS.

TRIAL OF DIVIDED SKIRTS—BRADFORD-LEEDS THROUGH RUNNING.

At the instance of Leeds tramway management, divided skirts are being worn by a number of the women conductors. If the Tramways Committee are satisfied that the garment is more suitable than the ordinary skirt, it will be generally adopted. During the year ended March 31 the Leeds and Bradford through running cars carried 362,242 persons, an increase of 64,906, or nearly 22 per cent. The through route is becoming very popular, and with increased railway fares and various other restrictions, the increase is well understood.

MANCHESTER.

FARE PROSECUTION—WOMEN CONDUCTORS' DANGEROUS PRACTICES —EXTENSION OF TIME FOR NEW CONSTRUCTION.

In a recent prosecution of a young man on a charge of attempting to evade payment of his fare, the defence was that the conductor did not ask for the money. She called out, "Tickets, please," and defendant put out his hand with half-a-crown in it, but the conductor omitted to take the money. In imposing a fine of 20s., the Bench said if everyone had to be asked definitely for his fare the Corporation would have to have an enormous number of additional conductors. It was shown that the conductor had been among the passengers at least nine times. Notice of appeal was given. At an inquiry into the death of a woman conductor, the evidence showed that she leaned forward, holding on to the brass rail, to speak to a trolley girl who was standing on the small platform of a single-deck car, whereupon she was knocked into the roadway by a motor wagon. It was stated by the Corporation solicitor that there was no need for the guards to go on the rear platform. The women had been warned against swinging from one platform to another, and a notice had been posted warning them of the danger. Under the provisions of the Extension of Time Act, 1915, Manchester Tramways Committee are applying to the Board of Trade for a further extension of the period limited for the construction of the tramways and the compulsory purchase of lands authorised in Section 31 of Manchester Corporation Act, 1911.

NEWCASTLE-ON-TYNE.

PROPOSAL TO LINK UP WITH GATESHEAD—EMPLOYEES' ROLL OF HONOUR.

Newcastle City Council propose to obtain powers to enable their tramways to be carried across the High Level Bridge and linked up with the lines of the Gateshead Tramways Company. The matter has been discussed by the Tramways Committee with a deputation representing Gateshead Corporation. After considering the deputation's report, the latter authority have decided not to support the project until the Bill has been considered by the Council, and all proper provisions which they might consider necessary to safeguard the interests of Gateshead have been inserted therein. The city tramway employees have placed in their club a roll of honour in connection with the war. Over 200 out of 600 men voluntarily enlisted. The casualties up to the present are 11 killed, 8 missing, 36 wounded, and one man a prisoner of war. The roll is placed in the centre of a collection of war relics collected by the men on service. These come from the western front and from far-off Kut-el-Amara.

OLDHAM.

TICKET SIMPLIFICATION—OLDHAM-MANCHESTER PARCEL TRAFFIC— PASSENGER BARRIERS ON THE MANCHESTER ROUTE.

In place of fourteen different types of ticket formerly issued on the Grains Bar route at Oldham, Mr. P. Priestly, the general manager, has re-arranged some of the distances and fares, thus necessitating fewer tickets. Hitherto many passengers have left the cars at Moorside and walked up to Grains Bar rather than pay 1d. for the short journey. Concessions of ½d. on 3d., 2½d., and 2d. rides have been made in order to induce people to book through to Grains Bar. Hitherto a considerable amount of money has been collected by the tramways parcels department from persons sending packages to Manchester and other places. The Tramways Committee have decided that in future the collection of accounts shall not be undertaken. The car service between the town and the city is to be increased from a 15 to a 10 minutes' frequency, and the management at Manchester are to be asked to co-operate in erecting a barrier to regulate loading at Hollingwood.

ROCHDALE.

WIND SCREENS OR VESTIBULES?

The question of adopting either wind screens or vestibules for the protection of the motormen has been engaging the attention of Rochdale Tramways Committee. Mr. G. Webster, the general manager and engineer, has received replies from seventy-one municipal tramways undertakings to questions which he forwarded to them for the purpose of ascertaining which method was most favoured. At the invitation of the Tramways Committee representatives of the drivers are to discuss the matter with a sub-committee.

SALFORD.

REMOVAL OF CENTRE STANDARDS—IMPROVEMENTS ON RELAYING— ENERGY FROM FOUR SOURCES.

After a satisfactory experiment in the substitution of side for central standards on the line between the Height and Pendleton, Mr. W. G. Holford, the general manager at Salford, has obtained the consent of the Corporation to the similar conversion of other sections. The wide thoroughfare from the Crescent to Chapel Street is now being dealt with. With the great increase of motor and horse-driven vehicles, the presence of standards in the centre of a roadway is recognised as dangerous, especially during a fog and the restriction of lighting consequent on air raids. The Corporation tramways, which were opened in 1901, have now had 14½ miles of permanent way relaid, the work having began in 1908. It was continued until 1914, when the war broke out. In nearly all of the relaying, rails of the Sandberg specification were used, and it is anticipated that this will give a longer life than the rails previously used. The Thermit process was adopted for the welding of the new rails. Now that the Board of Trade has urged upon the owners of electricity undertakings the importance of linking up in the interests of national economy during the war, it is of interest to note that Salford Corporation Tramways obtain energy from four sources. In 1915-16 the energy used for haulage, lighting of cars, etc., comprised 9,761,335 units, of which Salford supplied 7,821,017, Manchester 1,218,060, Eccles 704,909, and the South Lancashire Tramways Company 17,349. Deducting 36,547 units recharged to Manchester, the Salford cars used 9,724,788 units. The average power expenses per car-mile totalled 2·172d., and the mileage was 5,421,896, giving an average consumption of 1·793 units per car-mile, an increase of ·126 units as against the previous year.

PATENT LIST.

Abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

***** If the inventions have been communicated the names of the communicators are given below in italics.**

APPLICATIONS FOR LETTERS PATENT.

Electrical signalling systems (12,456)—F. G. Bell and W. C. Davey.
Trailer trucks (12,288)—A. W. Benson.
Fluid-pressure brake systems (12,353)—W. M. Cady and W. V. Turner.
Double automatic railway coupling (12,300)—W. Cook.
Controlling devices for coaster register mechanism for cars or trains (12,301)—F. B. Dehn (*Railway Improvement Company*).
Wheels for road vehicles (12,414)—Dunlop Rubber Company, Limited, and C. Macbeth.
Lifting jacks (12,345)—H. J. C. Forrester (*Hurlburt and others*).
Safety controlling gear for electrically-propelled vehicles (12,406)—F. Garrett and H. K. Pratt.
Life-guard for front of vehicles (12,438)—I. Pearson.
Paraffin vaporiser for motor car engines (12,374)—C. H. Richards.
Jacks and like lifting devices (12,185)—A. A. Scott.
Automatic air-brake systems (12,167)—Sprague Safety Control and Signal Corporation.
Regenerative braking (12,351)—T. H. Thomas and W. V. Turner.
Automatic train-control systems (12,352)—W. V. Turner.
Trolley poles for electric cars (12,316)—T. Warsop.
Pneumatic wheels or tires applicable as road wheels to vehicles (12,390)—W. Willoughby.
Dynamo-electric machines for combined electric lighting and ignition for motor vehicles (12,561)—B. Brooks and W. Holt.
Motor cars, motor lorries, etc. (12,467)—J. Heap.
Shape of holes for fixing chairs to sleepers (12,627)—W. E. Muntz.
Wheels for road vehicles (12,576)—C. E. Oliver.
Air brakes (12,489)—H. Pieper.

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Mechanism for facilitating instruction of drivers of self-propelled vehicles (12,500)—J. G. Torr.
Signalling on railways (13,138)—J. D. Bexon.
Automatic emergency control of steam and brake on locomotive engines (12,943)—T. H. Brett.
Process of bedding rails on sleepers (13,149)—C. Rabut.
Load indicators and controllers for motor trucks (12,930)—F. J. Troll.
Fare ticket devices for omnibuses, etc. (13,376)—W. Aitken.
Electrical signalling (13,269)—L. W. Austin, L. Cohen, and G. O. Squier.
Signalling on trains and indicating position of trains (13,345)—D. C. Davies and M. Davies.

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Clutches for motor vehicles (13,527)—T. A. Downton and T. H. Edwards.
Railway signal mechanism (13,445)—W. H. Dyson and N. B. Rabady.
High tension electric current collecting and transmitting or conducting devices (13,304)—Etablissements de Dion-Bouton Soc. Anon.
Traffic indicator (13,517)—S. T. Harris.
Motor vehicles (13,500)—P. F. Lajoinie and J. Maina.
Braking means for road vehicles (13,444)—E. Massis.
Wheels for road vehicles (13,252)—A. Ramsay.
Permanent way of tramways and railways (13,332)—C. Spreckley.
Petrol substitutes (13,469)—H. N. Tompkins.

Specifications Published.

1915.

Automatic couplings for railway cars (6,676)—Serguienko.
Railway signalling and train control (11,272)—Bound and Rowland.
Portable or self-laid tracks for road vehicles (15,292)—Pavesi and Tolotti.
Means for use upon motor cars and other vehicles to indicate the direction of turning (17,179)—Blake and Tipler.
Compressed air brakes (12,551)—Chapsal and Saillot.
Road wheels for motor vehicles (13,037)—Blake.
Driving axles or counter shafts for use on motor vehicles (14,687)—Humber, Ltd., and Burgess.
Mounting of the motor in power-driven vehicles (14,768)—Jern.
Construction of motor chassis (13,930)—Johnson.
Controllers for electrically driven vehicles (15,304)—Turner.
Apparatus for automatically stopping trains (7,527)—Radi.
Detachable rims for the wheels of motor road vehicles (12,227)—Baker.
Splash guards for the wheels of road vehicles (12,400)—Bather.
Tires for motor car wheels (12,464 and 12,469)—Crozier.
Systems of distribution for electrically operated railway trains (15,303)—Turner.

1916.

In the following list the numbers in italics are those that the specifications will finally bear and under which they will be indexed and abridged before acceptance and finally printed. The application numbers should, however, still be used for correspondence purposes.
Means for increasing the carrying capacity in cases of emergency of railway carriages, tramcars, etc. (2,376—*101,052*)—L. Jones-Powell.
Apparatus for indicating the speed of motor vehicles (5,086—*101,064*)—D. McNeill.
Railway rails and crossings for flangeless wheels (4,224—*101,119*)—W. J. Infield.
Tire for motor vehicles (2,181—*100,088*)—C. A. G. Deterding.
Electric car lighting equipments (3,559—*101,243*)—Albion Motor Car Company and T. B. Murray.
Lifting jacks (7,171—*101,272*)—W. J. Mellersh-Jackson.

Colonial and Foreign Tramways Traffic Returns.

NAME OF COMPANY.	1915. WEEKS ENDED. Sept. 4	Sept. 11	Sept. 18	Sept. 25		1916. WEEKS ENDED. Sept. 2	Sept. 9	Sept. 16	Sept. 23		AGGREGATE. Wks.	1916.	Increase or Decrease.
	£	£	£	£		£	£	£	£			£	£
Anglo-Argentine	49,780	49,469	47,626	50,319	...	47,933	52,818	51,992	...	...	39	1,926,886	− 4,000
Auckland	...	...	(28 days)	20,266	..	...	...	(28 days)	20,884	...	12	62,858	+ 563
Burma... ... ... Rs.	25,159	(4 weeks)	...	...	...	24,412	(4 weeks)	...	...	...	4	24,412	− 747
Calcutta ... ... Rs.	63,571	67,332	67,295	64,610	...	66,822	72,268	74,403	67,862	...	39	2,577,675	+120,145
Hong Kong ... ... $	...	...	...	...	...	...	...	...	...	...	37	491,805	+120,362
Madras ... ... Rs.	(2 weeks)	30,845	...	...	...	(2 weeks)	34,552	...	...	...	37	537,998	+ 38,241
Pernambuco ... ... $	2,900	2,902	2,880	2,785	...	3,149	3,437	3,181	3,145	...	38½	114,474	− 2,783

Companies Issuing Monthly Statements.

	1915. April.	May.	June.	July.	Aug.	Sept.	1916. April.	May.	June.	July.	Aug.	Sept.	Wks.	AGGREGATE. 1916.	+ or −.
	£	£	£	£	£	£	£	£	£	£	£	£		£	£
Ballarat & Bendigo ...	3,920	2,885	2,692	2,677	2,860	...	3,727	3,855	2,793	2,704	2,791	...	20	15,870	+ 836
Brazilian Traction Mlrs	6333460	6670110	6591940	6703000	6576000	...	6678000	7091000	6961000	7195000	7184000	...	35	54,329,000	+3,365,890
Brisbane	29,890	31,780	29,880	31,150	35,064	...	32,575	33,510	31,390	32,880	37,900	...	35	265 130	+ 20,416
British Columbia $	540,861	512,568	498,093	510,723	507,126	...	549,046	542,353	529,078	538,293	550,293	...	9	1,088,586	+ 70,737
Buenos Aires Pt. & C.	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Buenos Ayres Lacroze	41,765	44,480	40,421	41,460	41,468	39,355	40,220	41,503	36,213	38,439	36,431	37,075	13	111,945	− 10,338
Cape Town	...	...	...	...	...	...	...	...	12,920	13,357	13,394	...	—	—	—
Carthagena & Herrerias	1,496	1,931	2,059	2,157	1,523	1,252	2,513	2,927	3,512	2,371	2,081	1,779	39	22,600	+ 7,020
Cordoba	13,609	14,494	14,059	14,375	14,159	...	14,053	14,868	14,129	14,263	13,852	...	22	71,165	+ 469
East India	1,864	2,119	2,194	2,231	2,266	2,054	2,116	2,161	2,283	2,220	2,522	2,523	9	5,045	+ 725
Kalgoorlie	2,841	3,269	2,707	2,775	...	...	2,553	2,921	2,500	2,521	...	...	31	17,458	− 1,496
La Plata	4,269	4,489	3,875	4,054	4,164	3,894	4,354	4,343	3,735	3,909	3,792	3,994	39	37,622	− 257
Lima	31,633	...	...	...	32,004	...	33,556	...	...	...	33,395	...	35	270,710	+ 12,959
Manaos ... Rs.	...	...	...	...	...	...	155,030	152,854	144,913	152,380	...	...	—	—	—
Manila	...	...	...	23,750	...	...	...	...	...	33,700	...	...	31	887,739	+ 39,986
Melbourne	...	...	...	...	...	...	...	69,275	...	...	...	...	—	—	—
Mexico ... $	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Monte Video	26,786	27,771	24,266	25,161	26,494	25,070	28,997	28,349	25,300	25,220	26,044	26,711	48	319 043	+ 15,626
Port Elizabeth ...	...	...	...	...	...	...	...	2,809	3,166	2,863	...	...	—	—	—
Peruvian	...	737,166	759,374	724,838	819,039	755,280	...	826,900	929,500	835,430	895,900	911,910	13	2,643,240	+ 344,083
Rangoon	4,964	4,887	4,997	4,629	4,510	4,445	4,849	4,589	4,205	4,357	4,253	4,137	39	41,328	− 2,001
Toronto ... $	795,816	795,262	787,558	773,013	762,627	...	883,209	903,924	884,491	867,789	889,241	...	35	7,092,229	+ 746,526
Winnipeg ... $	264,856	263,302	255,549	248,022	251,189	...	282,498	276,980	254,686	242,688	249,795	...	35	2,193,957	− 57,510

(Continued on page 292)

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TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1915. WEEKS ENDED.				1916. WEEKS ENDED.				AGGREGATE.		
	Sept. 4	Sept. 11	Sept. 18	Sept. 25	Sept. 2	Sept. 9	Sept. 16	Sept. 23	Wks.	1916.	Increase or Decrease.
	£	£	£	£	£	£	£	£		£	£
Aberdare U.D. Council	341	343	342	343	412	407	408	408	25	9,770	+ 1,076
Aberdeen Corporation	1,927	1,869	1,901	1,673	1,983	2,252	2,041	1,854	16	31,932	+ 1,429
Accrington Corporation	556	633	592	617	591	663	598	624	25	14,854	+ 471
Ayr Corporation	407	442	558	340	638	575	474	376	19	10,273	+ 815
Bath Electric	*	...	...	...	...	...	...	...	—	—	—
Birkenhead Corporation	1,419	1,499	1,464	1,422	1,617	1,578	1,555	1,611	25½	39,309	+ 3 480
Birmingham Corporation	14,877	15,504	15,530	15,405	16,789	16,856	16,695	16,388	25	416,170	+ 63.072
Birmingham Corp. Motor Omnibuses	852	1,002	990	946	1,001	1.043	979	960	25	25,260	+ 3,030
Blackburn Corporation	1,238	1,364	1,503	1,563	1,304	1,323	1,417	1,375	25½	33,720	− 1,118
Blackpool and Fleetwood	1,976	2,145	1 607	1.304	2 352	2,247	1,631	1,268	38	36,452	+ 3,068
Blackpool Corporation	*	...	...	...	...	...	...	...	—	—	—
Bolton Corporation	2.760	3,423	2,774	2.678	2.977	3.407	2,837	2.963	26	74,950	+ 4,431
Bournemouth Corporation	2,652	2.570	2.509	2.168	3,109	2.998	2,618	2,432	26	64,533	+ 4,196
Bradford Corporation	6.653	6,862	6,689	6,468	8.136	7,045	7,497	6,572	25	177.495	+ 5,616
Brighton Corporation	1.405	1,497	1,386	1,278	1,703	1.695	1,562	1.386	25½	34.981	+ 3.274
Bristol	10.365	10,064	10,169	9,761	11,224	10.895	1,1026	10,516	38	83.221	+ 17.124
Burnley Corporation	1,653	1,909	1,743	1.576	1,819	2.009	1,850	1,738	26	45,187	+ 2,325
Burton-on-Trent Corporation	295	311	308	300	301	294	287	291	25	7,017	− 593
Bury Corporation	1,403	1.635	1,410	1.487	1,491	1.579	1,450	1,533	26½	37,822	+ 1,416
Cardiff Corporation	2.797	2.925	2 914	2 804	3,266	3.295	3,077	3.039	25	77.142	+ 6.251
Chatham and District	1.301	1,372	1,368	1,377	1,486	1,409	1,420	1,378	38	46.804	+ 1,924
Chesterfield Corporation	275	283	292	276	302	295	274	274	25	7.201	+ 245
Colne Corporation	275	312	358	255	293	317	340	278	—	—	—
Cork Electric	555	559	577	559	557	598	583	527	38	19,443	+ 158
Croydon Corporation	*	...	...	...	...	...	...	...	—	—	—
Derby Corporation	1,051	1,137	1,104	1,072	1,211	1,185	1,142	1,120	25½	29,345	+ 1,791
Dover Corporation	*	...	...	...	...	...	...	...	—	—	—
Dublin and Lucan	183	172	173	179	191	166	177	154	12	2,273	+ 177
Dublin United	6.257	6,561	6,644	6,469	6,831	6.739	6,802	6,269	38	229,496	− 3,184
Dundee City	1,410	1,443	1,466	1,370	1,457	1,493	1,512	1,386	18½	26,240	+ 726
East Ham Corporation	1,341	1,375	1,351	1,296	1,325	1,330	1,330	1,313	25½	33,848	+ 2
Exeter Corporation	425	433	427	408	478	472	454	439	25	10,449	+ 207
Gearless Motor 'Buses	*	...	...	...	...	...	...	...	—	—	—
Glasgow Corporation	22,530	22,947	23,117	22,277	23,552	23.809	24,085	23,450	16½	394,589	+ 27,294
Glasgow Subway	1,025	1,015	1,073	1,077	1,050	1,083	1,113	1,097	38	43,275	+ 3,904
Glossop (Urban Elec. Supply Co.)	123	146	150	150	152	153	151	150	39	5,399	+ 518
Halifax Corporation	2.383	2,476	2,507	2,213	2,702	2,545	2,412	2,191	24½	58,601	+ 840
Halifax Corp. Motor Omnibuses	55	56	53	50	52	53	52	51	24½	1,254	− 60
Hastings and District	1,375	1,517	1,389	1.273	1,646	1,734	1,552	1,329	38	41,047	+ 2,480
Huddersfield Corporation	2.734	3.535	2.687	2.674	3.015	3,569	2,849	2.805	25	76.044	+ 6,395
Hull Corporation	3.016	2,992	2,983	3,078	3,168	3,067	3,106	3,028	25	79,230	+ 1,307
Ilford U.D. Council	663	656	634	...	680	697	695	...	24	17,179	+ 850
Ilkeston Corporation	144	148	147	...	152	150	143	...	25	3.579	+ 164
Ipswich Corporation	594	671	615	587	601	560	553	514	25	14,106	− 677
Isle of Thanet	756	868	735	535	797	752	642	494	51	19,341	− 3,152
Kilmarnock Corporation	172	191	176	162	184	182	182	177	18½	3,364	+ 8
Lanarkshire	2,150	2,250	2,328	2,172	2,442	2,500	2,586	2,491	38	87,619	+ 13,294
Lancashire United	1,857	2,241	2,111	1,889	2,014	2,205	2,020	1,898	38	69,038	+ 2,482
Leeds City	9,101	9,377	9,394	9,084	10,534	10,075	9,823	9,990	26	252,664	+ 21,986
Leicester Corporation	*	...	...	...	...	...	...	...	—	—	—
Leith Corporation	785	826	787	795	933	913	914	856	18½	16,989	+ 2.014
Leyton U.D. Council	1,718	1,757	1,649	1,641	1,732	1,771	1,787	1,771	25	43,328	+ 617
Liverpool Corporation	13,913	14,069	14,206	13,978	14,964	14,662	14,367	14,219	38½	536.663	+ 25.959
Llandudno and Colwyn Bay	646	605	524	437	842	780	636	547	42½	16,114	+ 881
London County Council	*	...	...	...	...	...	...	...	...	—	—
London General Omnibus	*	...	...	...	...	...	...	...	—	—	—
London United	*	...	...	...	...	...	...	...	—	—	—
Lowestoft Corporation	*	...	...	...	...	...	...	...	—	—	—
Maidstone Corporation	226	253	259	251	239	246	256	243	25	5,679	− 157
Manchester Corporation	18,229	18,770	18,442	18,408	19,468	19,099	18,596	18,501	25	481,406	+ 25,159
Metropolitan Electric Tramways	*	...	...	...	...	...	...	...	—	—	—
National Steam Car	*	...	...	...	...	...	...	...	—	—	—
Nelson Corporation	...	...	233	186	...	...	239	209	25½	5,564	+ 425
Newcastle-on-Tyne Corporation	6.531	6,635	6,541	6,523	6,515	6.373	7,004	7,027	25	168,059	+ 5,381
Newport (Mon.) Corporation	857	880	910	865	1,105	1,020	1,013	967	25	24,265	+ 2.263
New St. Helens and District	1,131	1,224	1,291	1,149	1,132	1,187	1,130	1,000	12	14.375	+ 290
Northampton Corporation	691	751	771	732	759	733	725	731	25	18.055	− 1,409
Nottingham Corporation	3,795	3,904	3,875	3.739	4,191	4,187	4.063	4,084	25	98,792	+ 2.797
Oldham Corporation	2,552	2,554	2,344	2,336	2.636	2,504	2,414	2,512	26	66,833	+ 3,937
Portsmouth Corporation	...	2,917	2,840	...	...	3,320	3,370	...	—	—	—
Preston Corporation	1,035	998	1,031	994	1,187	1,196	1,170	1,123	24½	27,623	+ 3.070
Provincial	2,508	2,762	2,594	2,420	2.885	2,894	2,951	2,547	51	118,884	+ 6,716
Reading Corporation	827	891	843	829	957	975	983	909	24½	21,672	+ 1,226
Rhondda Tramways	1,252	1,238	1,262	1,263	1,404	1,495	1,438	1,410	38	48,572	+ 4,068
Rochdale Corporation	1,808	1,963	1,764	1,768	1,980	1,908	1,799	1,791	25½	47,063	+ 1,655
Rotherham Corporation	1,193	1,238	1,207	1,189	1,678	1,657	1,682	1,789	25½	40.061	+ 9,949
Salford Corporation	5,423	5,667	5,557	5,283	5,489	5,607	5,370	5,611	24½	142,744	+ 7,175
Sheffield Corporation	9,164	9,519	9,329	9,373	10,702	10,599	10,612	10,752	26½	275,637	+ 43,263
Southampton Corporation	1,701	1,682	1,668	1,660	1,828	1,916	1,900	1,737	24½	42,262	+ 3,455
Southend-on-Sea Corporation	1,136	1,074	992	908	1,474	1,351	1,226	1,054	25	26,730	+ 2.878
South Metropolitan Tramways	*	...	...	...	...	...	...	...	—	—	—
South Shields Corporation	844	848	820	799	971	892	869	864	25½	21,628	+ 909
Sunderland Corporation	1,539	1,598	1,516	1,493	1,732	1.872	1,638	1 679	25	42.297	+ 3,002
Sunderland District	609	604	596	544	685	724	713	640	46	28,755	+ 1,988
Swindon Corporation	217	214	219	223	236	240	225	222	24½	5.199	+ 94
Torquay Tramways	890	786	771	721	958	983	950	815	38	23,328	+ 1,618
Tramways (M.E.T.) Omnibus Co.	*	...	...	...	...	...	...	...	—	—	—
Tyneside Tramways and Tramroads	652	661	667	594	709	713	709	654	12	8,649	+ 615
Wallasey Corporation	1,446	1,486	1,425	1,321	1,627	1,595	1,442	1,351	25½	37,013	+ 1,922
Walsall Corporation	766	811	828	801	876	838	819	848	39	31,404	+ 3,030
Walthamstow U.D. Council	912	986	960	913	1,091	1,158	1,161	1,110	25	24,837	+ 4,221
Warrington Corporation	463	467	479	461	520	515	507	506	25	12,352	+ 945
West Ham Corporation	3,184	3,245	3,149	3,114	3,152	3,184	3,268	3,243	24½	81,970	+ 2.345
Wigan Corporation	1,555	1,587	1.647	1,567	1,687	1,711	1,762	1,695	25	42,170	+ 3.562
Wolverhampton Corporation	*	...	...	...	...	...	...	...	—	—	—
Yorkshire (West Riding)	1,657	1,746	1,607	1,566	1,898	1,912	1,806	1.894	39	68,601	+ 6,429

* TRAFFIC RETURNS SUSPENDED.

Owing to the European war, the Government have taken over the railways of Great Britain as from August 4, 1914, and the issue of traffic returns has been suspended. Consequently the traffic returns of the electric railways which usually appear on this page cannot be given.

The Publication of the Traffic Returns of the Tramways marked with an asterisk in the above table have also been suspended during the war.

TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officials and the principal particulars relating to each undertaking.

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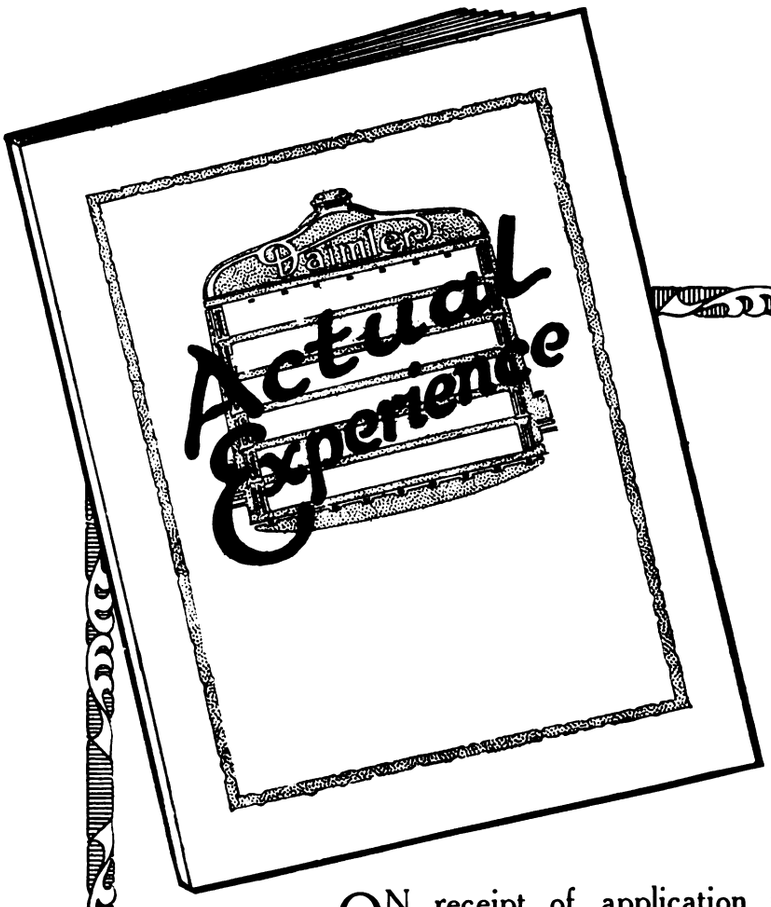

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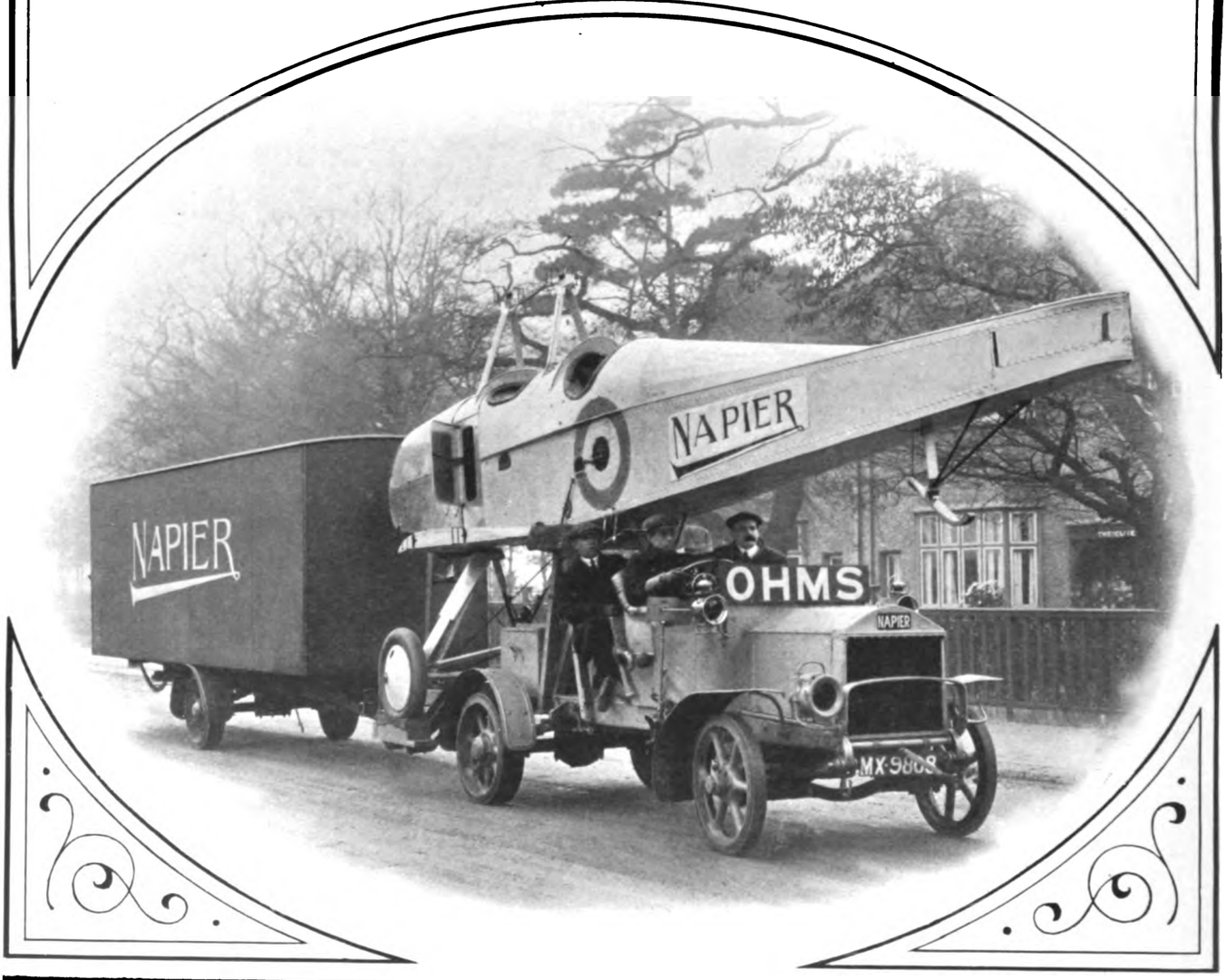

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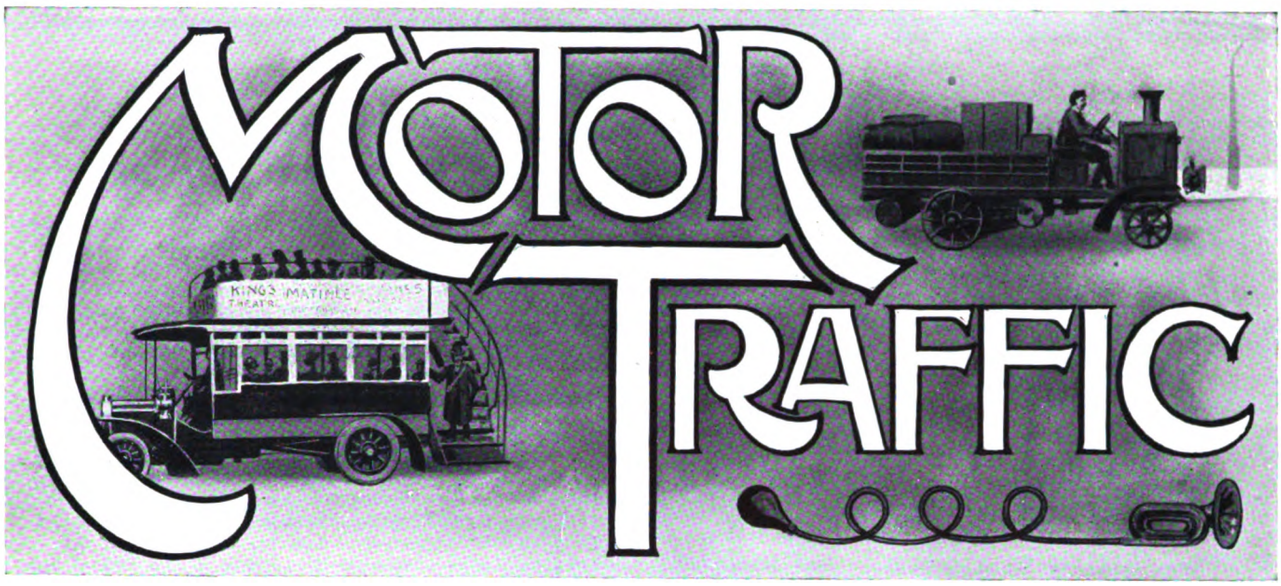

A day or two previous to the writing of these remarks news was received from the Petrol Control Committee to the effect that it was hoped, at the end of the present month, that the state of the petrol supplies would permit of larger allotments to the "civil population." This intimation, it should be added, contains the proviso "subject to Government requirements being fully met," but this qualification may be regarded as a matter of form, since it is hardly probable that the intimation would have been made had there been any serious element of uncertainty in the matter. Various rumours had been prevalent for a week or two before this authoritative announcement was made, and these rumours, strange to say, were neither confirmed nor denied officially. In point of fact, one was treated to the spectacle, so characteristic of Government departments, of individual officials—speaking unofficially—expressing opinions that were diametrically opposed. The hapless consumer of petrol was left to sift the grain from the chaff as best he could. Nor was this the end of his troubles. The extraordinary action by the authorities in regard to substitutes provided him with additional matter for reflection, and this puzzle still remains unsolved. The present position of the large consumer, therefore, is that he may, and very likely will, get more petrol after the end of the present month, but he does not know how much more, or whether he will definitely be permitted to eke it out with substitutes or not.

* * * * * *

The Petrol Control Committee may be a well-meaning organisation, but, judged by results, it is exceedingly difficult to speak of its work in terms of compliment. Although a purely emergency department, established for a certain specific purpose, with no hampering traditions, and composed largely of well-known business men, it has acquired in its brief spell of existence most of the vices that attach to the oldest of Government institutions. It is circumlocutory in its methods, inconsistent, and does not know its own mind, and affords a sufficiently instructive demonstration as to how pervasive is the official taint. No doubt it will be urged in the Committee's defence that it has been confronted by a formidable task, and has had very little time in which to do it, but it seems too often to have adopted the very methods that should be avoided in such conditions. It has discharged its duties with a deplorable lack of courage and grip, and more than once has justified the impression of utter indifference to public interests in the true and larger sense. As to the official point of view in general on the subject of substitutes, it is impossible for any reasonable person to understand what the difficulty is. There is nothing in the terms of the Petrol Committee's appointment to give it any authority at all over fuels other than "motor spirit," as the term has always been understood. Its real purpose is to conserve the supplies, and restrict the consumption of petrol, and it has no mandate of any kind to stop motor transport in any shape or form, apart from the consumption of that commodity. Nevertheless, the Government has proceeded on a much broader assumption, with ludicrous results. The prosecution of chars-a-bancs owners and the ridiculous intimation as regards substitutes are nothing more than vexatious and stupid interference with trade and industry, and are calculated to hinder, rather than help the successful prosecution of the war. These particular matters are not, of course, traceable to the Petrol Control Committee, but that body must take its share of the responsibility that attaches to officialdom in general for an attitude towards motor transport that is both inexplicable and deplorable.

Entanglements to a serious extent appear likely to result from the policy of drift that has come about in the reconsideration of the regulations affecting public passenger vehicles and other heavy motors. The latest departure is to be seen in the Local Government Board suggesting to the Brighton Corporation that they should lease the right of user by motor omnibuses of the roads within their jurisdiction. Seemingly the Board have not quoted any statutory basis upon which a lease can be effected, so we must conclude that the idea is for compounding any sums that could be charged for routes not used before March 1, 1914, under the Act passed a few months ago, for the purpose of reducing road wear during the period of the war. The suggestion on the part of the Whitehall authority provides in unexpected form a justification for one of the main arguments advanced by traction interests against the passing of the Local Government (Emergency Powers) Act, 1916. For the period of the war it establishes a rental for the use of streets that have been constructed for the public convenience. This course is looked upon as such a questionable proceeding in the case of tramway wayleaves that the charges are not embodied in a Bill, but are made the subject of an outside agreement as the condition upon which a local authority supports a company's application for powers. The results have not been altogether

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MOTOR TRAFFIC.

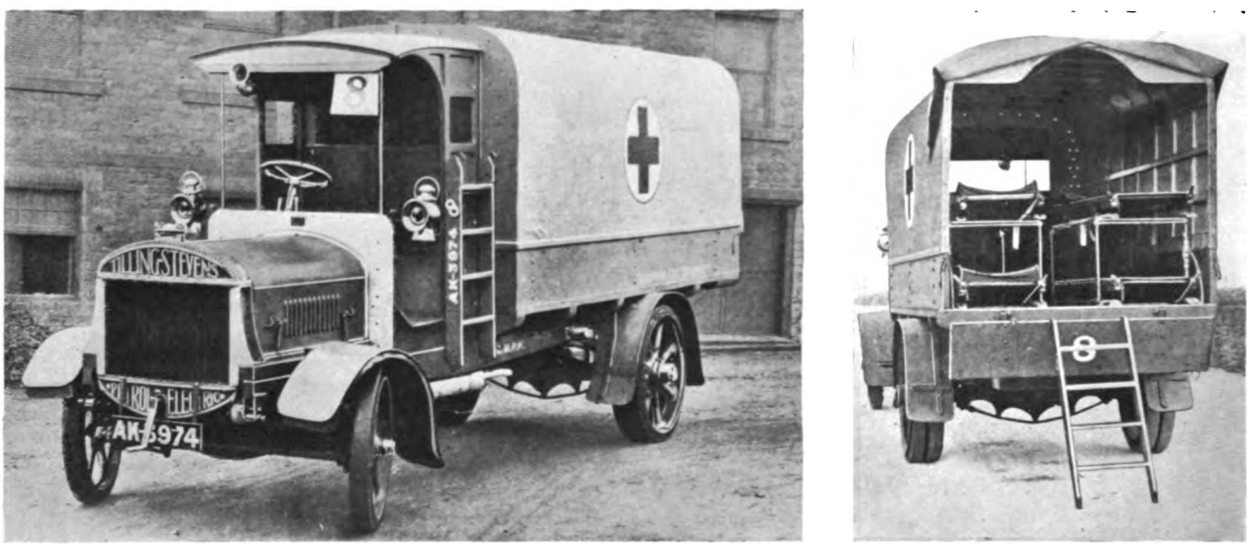
satisfactory to the tramways, and it is not desirable that motor vehicles should be burdened with imposts other than any that may be provided after due consideration by Parliament. Before the war a practice had grown up of Parliamentary Committees fixing a charge of ⅞d. of a penny per car-mile for railless trolley cars, and a similar rate was imposed for motor omnibuses using the new western Middlesex outlet from London when that thoroughfare has been constructed. Under the Emergency Powers Act, local authorities are already seeking to secure payments far in excess of that sum; West Sussex, for example, is asking 3d. per mile. The suggestion that has been made to Brighton accompanied the Local Government Board's refusal to allow the Corporation to apply during the war for a Provisional Order to enable them to run omnibuses on any route, instead of applying for a renewal of the powers obtained a few years ago to run them on routes for which railless trolley powers have also been secured.

PATRIOTIC WORK AT BRADFORD.

TRAMWAY ROAD MOTORS AS AMBULANCES AND MUNITION WAGONS.

During the past year the Bradford Tramways department has equipped several of its petrol vehicles used in the parcels service for the accommodation of stretchers. Each van has a capacity for eight stretchers. The fittings are of such a character as to enable the vans to be quickly converted into ambulances, which have considerably facilitated the transportation of the wounded. This work is undertaken by the Local Wounded Transport Service Committee, which comprises members of the Bradford Automobile Club and of the National Motor Volunteers.

Another useful form of work undertaken by the department is the conveyance of material for a national munitions factory. In the parcel traffic section of his annual report Mr. C. J. Spencer mentions that a new Tilling-Stevens 3-ton petrol wagon, which was originally intended for overhead equipment work, was temporarily taken over by the parcel department on June 14, 1915, at a cost of £694, and was immediately placed on work for the munitions factory, and has been kept steadily at that work ever since. The remainder of the petrol lorries have been kept fully occupied in work for the education and health departments, in connection with the collection and distribution of food, and on occasions when the



Bradford Corporation Tramway Parcels Van Fitted as an Ambulance.

Another reason that led to the larger application was the disputes that lately attended the Council's refusal to license a second company, which decision was upheld by the courts.

VOLUNTARY MOTOR TRANSPORT.

The Secretary of State for War has authorised the formation of a committee to deal with the question of the organisation of motor transport in the country on a voluntary basis in connection with the National Volunteers. The committee consists of Lieut.-General Sir E. C. Bethune (chairman), Director-General of the Territorial and Volunteer Forces; the Hon. Arthur Stanley, M.P., chairman of the Royal Automobile Club; Major-General Macintyre; Mr. Joynson-Hicks, M.P., chairman of the Automobile Association and Motor Union; Mr. Orde, secretary of the Royal A.C.; and Mr. Cooke, secretary of the A.A. and M.U.

The Hon. Arthur Stanley states that the work of the committee will be to co-ordinate with the objects of the Central Association V.T.C. the labours that have been voluntarily carried out during the war by the Royal Automobile Club and the Automobile Association. The R.A.C. and A.A. have been supplying the Quartermaster-General's Department with cars for the service of officers, transport, and other duties, and it is intended now to see how far this effort can be adopted for the Army Service Corps work and the Volunteer Force.

vehicles had been kept in the shed for repairs it has been very difficult to hire suitable vehicles to cover the work. Largely from the earnings of the motor wagons the income of the parcel department had increased £436, but the expenses had gone up £1,230, due to wages, repairs, and petrol. The parcel revenue had decreased £436, and the margin of surplus was so small as to raise the question of increasde rates. The department had done a large amount of work for the various charitable and patriotic committees in connection with the different funds inaugurated by the Lord Mayor and Lady Mayoress, for which no charge had been made, the cost incurred in this direction being approximately £150.

MOTOR CAR IMPORTS.

The annual statement of trade of the United Kingdom for 1915, issued by the Board of Trade on September 18, shows that in that year, at any rate, the import tax placed on motor cars did not have a great effect on the number imported. The tax, however, did not come into force until September 29. In the four years 1911–14 the number of complete cars imported ranged from 6,778 to 7,520. Up to September 29, 1915, the number was 12,476, and for the remaining three months 3,700. The United States sent 14,892, which is more than double the number supplied by that country in 1914. The chassis imported number just over 3,000, while before the war the number was nearly the same as for complete cars. Imported motor cycles increased from 2,559 in 1914 to 4,531.

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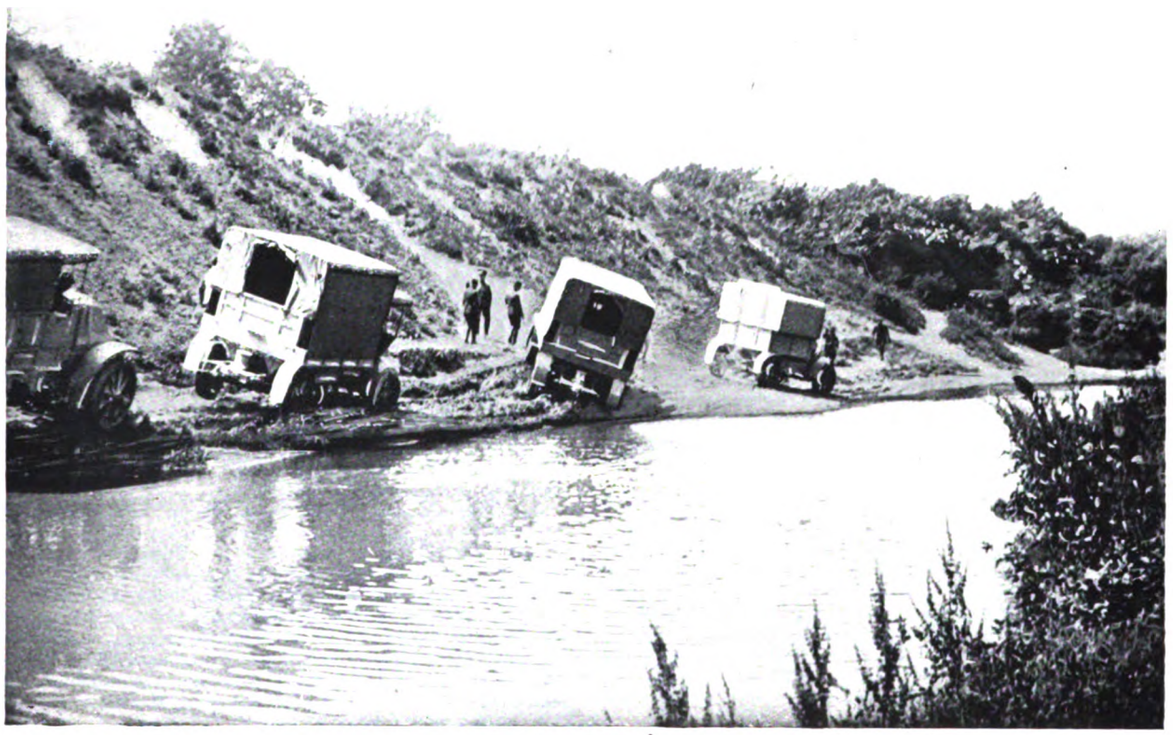
MOTOR TRAFFIC.

MOTOR TRACTION IN THE ADVANCE.

How vast has been the aid rendered by motor vehicles and rail transport to the victorious advance against the German entrenchments during the month of September will perhaps never be known until the history of the war is written. An idea of the rough ground that ambulances and wagons are capable of traversing is given by the photograph reproduced on this page by the courtesy of the *Daily Sketch*. It is a riverside scene on the way to Verdun, where our Ally has made so gallant a stand. This track was followed to secure safety from shelling.

A glimpse of the activity in the rear that preceded and followed the capture of Combles at the end of September is afforded by a dispatch from the correspondent of the United Press of America. He writes :—" It was only when I reached the advanced artillery lines that I could grasp the methodical progress which has rendered irresistible the Allies' new tactics of advancing by heavy artillery



Army Supply Motors en Route

only. The front artillery lines consisted of comparatively light batteries, rushed forward during the night over ground rendered impassable by shell holes to everything but foot soldiers.

" Back from these advanced lines were thousands more soldiers transforming what had been cassion roads into highways capable of sustaining huge automobile convoys, bringing up heavier munitions for heavier artillery that had supplanted the lighter guns.

" Behind these automobile-fed artillery lines was a third army of workmen steadily constructing railways which were bringing up artillery so gigantic, that not only it, but its munitions, were transportable only on specially constructed railways. These huge pieces were supplanting the more transportable automobile-fed pieces already pushed forward. This method marks the advance on the entire 40-kilometre Somme front."

To the foregoing a word must be added to refer to the irresistible sweep of the German trenches, fortified cellars, and machine gun nests that has been made by the British use of the caterpillar tractor sheathed in armour. A reference to the value of this tractor for the haulage of guns appeared in our issue of September 14, but their value as fighting units during the Somme advance came as a revelation to the world.

MOTOR VEHICLES FOR MUNICIPALITIES.

Bolton Council are purchasing a motor ambulance for their fire brigade.

Tynemouth Council are considering the advisability of purchasing a motor fire engine.

Burton-on-Trent Council have decided to consider the question of obtaining a motor fire engine.

Barnoldswick Urban Council have placed an order for a motor wagon for the collection of refuse.

Manfield Council have ordered a 2-ton battery wagon from the General Vehicle Company, at £1,070.

Barnsley Council have directed the fire brigade superintendent to prepare a report on the cost of supplying a motor fire engine.

Bristol Council have agreed to purchase a third motor fire engine from Messrs. Dennis Bros., of Guildford, for £995. The other two 60 h.p. engines have been in use since July, 1914, and their cost was £905 each.

The Metropolitan Asylums Board have purchased a Garrett steam tractor and three 6-ton trailers, for use at Leavesden Asylum in the cartage of coal 3½ miles from King Langley's wharf. To meet the asylum's requirements 20 tons of coal have to be delivered daily, and the decision to use their own mechanical traction will effect a great saving.

Flaxton Rural Council have been recommended by their surveyor to purchase a 5-ton steam tractor and two tipping wagons. That officer estimates that the vehicles would effect an annual saving of £385, which in two years would equal the purchase price of the tractor and trailers. The Council have deferred coming to a decision for two months.

Order for 2,400 Peerless Trucks.—One of the Allied Governments has placed an order for 2,400 Peerless motor trucks, through Messrs. Gaston, Williams, and Wigmore, of New York. Delivery has already been begun and will continue at the rate of from 80 to 100 trucks a week.

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MOTOR TRAFFIC.

MOTOR TRACTION FOR MUNICIPAL WORK.

FROM A REPORT BY MR. H. SHAWS, M.Inst.C.E.
(*Engineer and Surveyor of Ilford U.D.C.*)

In accordance with the instructions of the Ilford Urban Council Mr. H. Shaw, M.Inst.C.E., their engineer and surveyor, has presented to that authority a report dealing fully with the advantages and disadvantages of mechanical *versus* horse traction in order to enable the Council to form an opinion whether or not their work can be carried out to greater advantage by the substitution of horse labour by mechanical traction. He observes that it is essential the motors should be kept continually at work, and it is most important that loads up to the guaranteed capacity should always be carried, as it is only by carrying heavier loads than is done by horse labour that economy can be achieved.

In making inquiries from municipalities regarding their experiences of mechanical traction, many expressions of appreciation of such vehicles were received, and Mr. Shaw adds: "It has also been found by private firms and haulage contractors, after many years of experience, that it is more profitable to work mechanical traction than horse work, and this alone, from a financial standpoint, is conclusive evidence of the superiority of motors in this respect from a contractor's point of view."

RUNNING COSTS.

In regard to the running costs of the four classes of vehicle there seems to be little difference. The electric vehicles in the first case are exceedingly dear; with the steam, petrol, and petrol-electric vehicles taking second place, the running costs in the three last cases, so far as can be gathered, are slightly more. The electrical vehicle may have an advantage in this matter if the "all in" price of energy can be guaranteed not to exceed the current price of 1d. per unit delivered in the vehicle at the requisite voltage with a full unit.

Statements of running costs and comparisons between motors and horses are often misleading unless due consideration is given to local conditions. Again, some drivers will use 50 per cent. more coal, oil, &c., than others in doing the same amount of work, and the wear and tear as well as the work done will vary considerably according to the varying capabilities of the men employed. The method by which the machines are purchased should also be before you, in order that due weight be given to the capital charge. The figures obtained from other towns must not therefore be taken with any great amount of reliance as being applicable to this district, although they serve to give an idea of what the costs might be should the Council adopt mechanical traction.

It is clear from the published statistics that motor vehicles have been adopted to an unexpectedly satisfactory extent by local authorities for miscellaneous services, such as sweeping and watering of streets, the removal of refuse, haulage, &c., and the fact seems now to be clearly established that in services of this sort, in the great majority of districts, motors show a better economy than horse haulage, and this irrespective of the subsidiary advantages of being able to complete a given piece of work in a shorter time, with the consequent power of selecting the most convenient hours for any particular work and frequently duplicating the employment of a motor by providing alternative bodies for it.

INFORMATION SUPPLIED BY LOCAL AUTHORITIES.

The report proceeds to give the details derived from a large number of local authorities from which the following extracts are taken:—

Aldershot.—One 5-H.P. steam watering wagon, convertible for haulage. "Five tons carrying capacity. In the summer a 600-gallon tank is placed upon the chassis for watering purposes. In winter this is removed and the vehicle employed for collecting house refuse. The vehicle pays in both respects, while the cost for horses remains at 12s. 0d. per day, but at the old figure during the pre-war period of 7s. 6d. per day the vehicle would not show a satisfactory financial return. Efficiency is the main objective, and I think that has been attained."

Barrow-in-Furness.—One 30-35 H.P. (3½ tons) petrol watering wagon and tank. "Most serviceable. Cost about £750 complete. Rubber tires. Although not more economical than horses for street watering, is found to be more convenient. With regard to running costs, everything depends upon method of loading, length of journeys, and whether loads can be run each way. Life, about seven years. Life of tires, approximately some 10,000 miles for rear tires and perhaps slightly more for front tires. For general haulage there is no doubt the petrol-driven wagon is cheaper than team labour where distances covered are over one mile, but not where frequent starting and stopping and slow loading are necessary."

Bedfordshire County Council.—Petrol motor lorries. "Haulage of material over long distances, 3·93d. per ton-mile."

Birmingham.—Two steam wagons used for moving road stone. "Cost £580, including 1,000-gallons interchangeable water tank (£90). One by Messrs. Aveling and Porter; one by Messrs. Fodens, Limited. Iron tires. Cost approximately 9d. per mile."

Blackpool.—"Although we have only had the electric vehicle since the last week in July, what it has accomplished in this period has convinced me that it will prove a great saving, as the work it can perform during an ordinary day of nine hours is really marvellous. It has already displaced six horse-drawn watering vans, whilst in connection with the washing of our Promenade it has released four men for other work, which is, of course, equal to saving of four wages for this class of work alone. Taking an average day of nine hours, the vehicle waters 48 miles of streets, using twenty-four loads or 18,000 gallons of salt water. The usefulness of the vehicle is not limited to the watering of streets, as it has accomplished good work in connection with the cleansing of sewers; as with a flush of 750 gallons we are in many cases saved the trouble and expense of having to resort to dredging. The vehicle is also used for the washing of streets in conjunction with our motor sweeping machine. Only half the usual quantity of water is used, whilst the work is done better and quicker. This street sprinkler is equipped with a standard 3½-ton 'G.V. Electric' chassis and an 'Ironclad' battery. The battery is charged from the electric plant at the refuse destructor. The tank is removable, so that when the sprinkling season is over a van body may be put on and the vehicle used for dust collection or other purposes."

Bradford.—This corporation have a petrol lorry used for permanent way work (3-ton capacity), the running cost of which, including petrol, lubrication, tires maintenance, and depreciation, works out at 7·8d. per mile. Also a steam lorry, 4 tons 19 cwts. load capacity. No record has been kept of the running cost of this vehicle.

Bristol.—Petrol vans (sweeping machines) used for sweeping wood and pitching. Four cylinder, 10-12 H.P. Capacity for spraying water, 60 gallons. Cost, £638 each (cover for driver extra). Petrol per mile, 10 miles per gallon. Easy to handle and doing good work. Two 3-ton steam vans for general hauling purposes, principally long-distance work. Cost complete, £545 each. Makers, Yorkshire Commercial Motor Company. Three-ton wagon fitted with mechanically-operated tipping gear. Fuel, 1s. 8d. cwt. steam coal per mile. One gallon cylinder oil and one gallon engine oil per 50 miles. Machine complete with driver, fuel, etc., charged to works at rate of 25s. per day to cover all expenses and depreciation. The lorries and sweeping machines have been in use for six months, consequently the engineer is unable to give reliable information regarding maintenance and repairs.

Burton-upon-Trent.—One steam wagon carrying 4½-ton load. "Capital cost, £614. Used to convey clinker from refuse destructor to sewage farm six miles away; in conjunction with its use a screening and elevating plant has been erected at a cost of £480, and the total annual working expenses, including repairs, amount to £490. Average cost of haulage only is about 6d. per ton-mile. Usual cost of haulage by horses is about 1s. per ton-mile."

Chelsea.—Sixteen 40-H.P. steam wagons. The experience of twenty years has shown that about 40-H.P. is required for an efficient municipal motor van, and a price of £550 is not excessive. Motor vans have been used in Chelsea for municipal purposes since 1900. In all cases the vehicles were purchased out of current revenue, and not by means of a loan. A Leyland vacuum tank has been hired from the makers since 1911 for cleaning out street gullies. Average annual cost of maintenance has diminished from over £60 in 1900 to £40 in 1906.

	1907-8	1913-14
Average total cost per annum for each motor dropped from ...	£254	to £194
Cost, less wages of driver, etc.	£95	„ £77
Average cost of collection of house refuse by horses and vans for six years, 1901-7	4s. 9½d. per ton	
Average cost of collection of house refuse by motor for four years, 1910-14	4s. 6d.	„

Cost of two motors used for removing house refuse during last three quarters of 1914:—

Motor No. 1—	
Dust collected, average	6 tons 3 cwts 1 qr. per day
Cost (motor only)	8s. 0½d. „
Motor No. 2—	
Dust collected, average	5 tons 8 cwts per day
Cost (motor only)	7s. 5d. „

Chiswick.—Two steam vans used for all purposes. 850 gallons capacity water vans. Cost, £655 each, with special vacuum gulley-emptying apparatus. Maker, Yorkshire Commercial Motor Company. Impossible to give information as to running cost owing to short service, but approximate consumption of fuel is one cwt. of coke and one cwt. of coal per day on an average of 30 to 35 miles. In addition to body being used for above purposes, it has been provided with a patent vacuum emptying apparatus, a steam jet

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MOTOR TRAFFIC.

creating the necessary vacuum, and this has been found fairly satisfactory. Council lets vehicles on hire—resulted in a fair return.

Denbigh.—One 5-ton tipping wagon with interchangeable iron tank (1,000 gallon capacity) to fit inside of body and fitted for street watering and sewer flushing (Foden—steam). "Used for street watering, sewer flushing, and haulage of macadam and other materials for road repairs. I do not think there would be any saving in the employment of these vehicles for collection of house refuse, etc.; they pay better in long runs than short ones."

Deptford.—Petrol motor-sweeping broom. The cost for one year's working from February 22, 1915, to February 21, 1916, is as follows—No. of days worked, 289; average mileage per day, 27·78; average consumption of petrol, 3·55 gallons per day and 7·83 miles per gallon; lubricating oil, one gallon to 175 miles; axle grease, 1 lb. to 41 miles. Cost of working the machine for the year stated, including depreciation at the rate of 12½ per cent., is £396, equivalent to 6/2·84d. per mile on roadway sweeping. The cost of the same work by horsed brooms would have been £655, or 10/5·7d. per mile.

Derby.—Steam lorry used for highway work and coal carrying. Cost, £565. Make, Fodens, Limited.

Ealing.—Two 25-H.P. (5 tons) steam wagons; trailer 3 tons. "For street watering and general haulage (unless gradients are very steep). I consider each lorry supersedes 3 to 3½ horse-drawn vehicles. Should roughly say that, including repairs, depreciation, driver's wages, fuel, etc., the costs amount to about £1 per day."

Folkestone.—Two 48–50 H.P. petrol vehicles. "I think I am safe in saying steam rather than petrol for refuse collecting, but petrol rather than steam for fetching and carrying road materials where long distances with good loads can be relied upon."

Glasgow.—Two 30-H.P. petrol hand-tipping (3 tons); several Laffly and Lacre motor sweepers. "While no economy can be claimed in the case of the refuse removal wagons, the street watering machines have proved highly serviceable and more economical than horse haulage. The vehicles are not equipped with interchangeable bodies. My committee has decided to introduce two electrically-propelled vehicles for collection of domestic refuse."

Hambledon.—One 40-H.P. 5-ton petrol (Dennis) side-tipping lorry.

RUNNING COSTS, JULY, 1914, TO JULY, 1915. MILEAGE, 11,184.

	£	s.	d.
Wages (driver and two mates)	220	0	0
Petrol (6 miles per gallon)	116	12	2
Oil and grease	15	19	3
Maintenance on a basis of 20s. per week	52	0	0
Insurance	16	0	0
Tires	73	16	0
Interest	36	0	0
Depreciation (15 per cent. on £660)	99	0	0
	£629	7	5

COMPARISON.

	£	s.	d.
Prices obtained for carting by contract	951	0	6
Cost of running motor	629	7	5
Saving	£321	13	1

Hammersmith.—One 32-H.P. (3½ ton) sheet steel tipping body, interchangeable with cylindrical tipping water tank body (750 gallons capacity). Used principally for scavenging and watering. "This has been engaged in collecting house refuse, but cost was greater than when horses were employed. We discontinued using it for this purpose, and now use it for general haulage work. I am of opinion that this will prove the most economical work."

Kent County Council.—Ten lorries for haulage purposes (J. and E. Hall, Limited, petrol). "In 1910 the County Council purchased two lorries, and this number was increased to ten. In pre-war days the average mileage travelled was approximately 13,500 miles per annum. Consumption of petrol varied from 4·3 to 4·5 miles per gallon, and average daily working cost from £1 7s. 7d. to £1 9s. 5d. The cost of these lorries originally was £780. Have not used interchangeable bodies. Cost of haulage of material per ton per mile is: Lorries about 6d., horsed vehicles 1s."

City of London.—Four 3-ton (7 yds. cubic) dust wagons, interchangeable with water bodies (700 gallons capacity). Thorneycroft steam. The Corporation has ordered six "J" type Thorneycroft petrol motors in place of above (one only supplied). "These wagons have a carrying capacity of refuse of three tons, and are fitted so as to be utilised for collection of refuse or street watering; for the latter purpose they are both efficient and economical, but not quite so economical for the collection of refuse."

Norwich.—Three wagons, 4, 5, and 6 tons respectively. Tipping bodies interchangeable with watering. (Yorkshire Commercial Motor, steam.) Used entirely for carting macadam, coal, coke, and soil, and in summer for watering suburban roads. When carting macadam, quick loading is ensured by employing an electric crane and grab bucket, and quick discharge by tipping; a certain amount of rough spreading is carried out as the wagon travels. Thus the wagons are made to show a satisfactory cost charge on such short haulages. Great care is taken that, so far as possible, the full tonnage is carried at each load.

RUNNING COSTS DURING YEAR ENDED JUNE 25, 1913.

STEAM WAGON "A" (4 TONS), 11 YEARS OLD.

Miles per load (average)	2·182
Cost per load (average)	8s. 6·315d.
Cost per load per mile	3s. 10·895d.
Cost per ton per mile	11·7d.

Depreciation at 10 per cent. included.

STEAM WAGON "B" (5 TONS), 8 YEARS OLD.

Miles per load (average)	1·93
Cost per load (average)	7s. 7·365d.
Cost per load per mile	3s. 11·34d.
Cost per ton per mile	9·5d.

Depreciation at 10 per cent. included.

STEAM WAGON "C" (6 TONS), 5 YEARS OLD.

Miles per load (average)	1·3
Cost per load (average)	4s. 2·277d.
Cost per load per mile	3s. 2·67d.
Cost per ton per mile	6·5d.

Depreciation at 10 per cent. included.

Each Committee is charged 4s. per hour, which is slightly more than the actual cost of running. The hiring rate for horse in this town was 7s. 3d. per day. In this district, when watering, a van covers about 9½ miles per day at a cost this year of 12s. 6d. per horse and man. The gallons of water distributed are approximately 7,400. When scavenging, one horse cart and man collects about and tips 3½ loads of sweepings per day at a cost of 12s. 6d.

Paignton.—One 5-H.P. 5-ton wagon, tipping body, interchangeable with watering tank (Foden, steam). "Proved to be a great economy and convenience, especially for long journeys and in street watering."

Rochdale.—One 3½-ton (net) wagon. Clayton and Company, petrol. "It cost £700, and was put to work in an added area instead of adding four horses, stables, and vehicles. It has done well, and been in use five years, and we are now considering the matter of a further mechanical vehicle."

Sheffield.—The report gave a summary of the statement prepared by the Sheffield cleansing superintendent on the very successful results of a 22 weeks' trial of two Edison electric refuse vans as against horse vans, which was published in our issue of June 8.

VARIATIONS IN RUNNING COSTS.

			Cost of Motor Traction.	Cost of Horse Working.
Anglo-American Oil Co.	Steam	Haulage	5·78 per mile	
Anglo-Mexican Oil Co.	Steam	Haulage	1/2 per mile	
Bedfordshire C.C.	Petrol	Haulage	3·93 per ton mile	
Birmingham	Steam	Haulage	9d. per mile (approx.)	
Bradford	Petrol	Permanent Way Work	7·8d. per ton mile	
Bristol	Steam	Haulage	Charged to works at 25/- per day	
Burton-upon-Trent	Steam	Clinker conveying	6d. per ton mile	1/- per ton mile
Chelsea	Steam	Refuse collection	4/6 per ton	4/9½ per ton
Deptford	Petrol	Sweeper	6/2·84 per mile	10/5·7 per mile
Ealing	Steam	Watering, haulage	£1 per day	
Hambledon	Petrol	Haulage	£629 7s. 5d.	£951 0s. 6d.
Kent C.C.	Petrol	Haulage	6d. per ton mile	1/- per ton mile
Kingston-upon-Thames	Steam	Watering	2d. to 3d. per mile saving over horses	
Leeds	Motor	Sweeper	7·1d. per mile	
Luton	Steam tractor	Haulage	4d. per ton mile	
Norwich	Steam	Haulage	11·7d. per ton mile, 4 ton 9·5d. per ton mile, 5 ton 6·5d. per ton mile, 6 ton	
Nottingham	Steam	Haulage	3¼d. per ton mile	
Richmond	Steam	...	18/- per day, exclusive of loan and interest	
Sheffield	Electric	Refuse collection	5/0·8 per ton by day 2/3·4 per ton by night 4/0·1 per ton by day 1/10·3 per ton by night	7/0·4 per ton by day 3/3·2 per ton by night 3/8·6 per ton by day 2/6·2 per ton by night
	Motor lorries	General	5·55d. per ton mile	
Southend	Steam	Watering, 1,000 gal. van 630 gal. van	29/1 per day 1/1·6 per mile 38/1 per day 1/- per mile	
Surrey C.C.	Petrol	Haulage	4d. per ton mile	

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MOTOR TRAFFIC.

"The difference in figures may be caused by many reasons. Running costs, for instance, is a term which may be answered in a variety of ways; then there are the load factors (overloading and underloading), local and traffic conditions, wear and tear and repair items, amount of time in which the machines are standing idle or working, etc., etc.

"In order that you may have all available up-to-date information at your disposal, I quote other figures which have been compiled by an expert on mechanical traction, after full consideration being given to all makes of vehicles and varied conditions. The table, therefore, may be taken as a very fair guide in regard to running costs, and considered with the statements of other municipal authorities, and their explanatory notes and the manufacturers' estimates, a reasonable conclusion can be arrived at.

"For the petrol-electric vehicle, I have taken the running cost as above, as given by T. Tilling, Limited, who work motor lorries, mail vans, etc., with this type of vehicle. The contract prices for this year are higher than they have previously ever been, and it is hoped prices for horse labour will decline considerably when the present hostilities are ended. Against this the prices of fuel, oil, and tires of motor vehicles will also decrease, so that the ruling prices of the present time can be taken as fair comparisons.

HAULAGE WORK. DAY WORK PRICES.

Journeys between 1 and 2 miles one way.
Horse labour, 12s. Average 5 journeys with a load of about 30 cwts. each journey. Total material, 7½ tons.
Petrol, steam, electric, or petrol-electric vehicles can all average 10 journeys with a load of about 3 tons each journey. Total material hauled, 30 tons.

	s.	d.
At daily costs of—		
Petrol	33	2
Steam	33	11
Electric	33	0 (6·1d. per ton-mile).
Petrol-electric	30	10 (40 tons).
Result, day work rate—		
Horse labour	1	7·2 per ton.
Petrol vehicle	1	1·2 "
Steam vehicle	1	1·5 "
Electric vehicle	1	0·2 "
Petrol-electric	0	9·2 "

PIECE WORK.

Journeys average 2 miles cartage.
Horse labour, 1s. 4½d. per ton.

	s.	d.		
Result, piece work rate—				
Horse labour	1	4·5	per ton or 8·2d.	per ton-mile.
Petrol vehicle	1	1·2	" 6·6d.	"
Steam vehicle	1	1·5	" 6·7d.	"
Electric vehicle	1	0·2	" 6·1d.	"
Petrol-electric	0	9·2	" 4·6d.	"

NOTE.—In a paper read last month by a responsible official of the Sheffield Corporation it was stated:—"An advantage of motor transport, as compared with horse haulage, is that the motors would serve a radius of 30 or 40 miles per day, as compared with 12 miles for horse haulage."

"In calculating rates of the motor vehicles, I have allowed the same cost for a two-mile journey as 1⅛ miles or 1¼, and for a 3-ton load, whereas some of the 3-ton vehicles carry between 3 tons and 3 tons 17 cwts. In order to explain more fully the meaning of the first part of this statement, it seems advisable to point out that when on piecework as soon as a horse vehicle has gone over one mile the two-mile rate is paid. The same rate per mile has also been allowed for returning empty to fill up, as when full also the extra distance rate. You will therefore see that, although a saving will be made of practically 3d. to 3½d. per ton in the cost of petrol or steam vehicles, and 4½d. per ton by an electric vehicle, and 7¼d. per ton by a petrol-electric vehicle, it would really work out in practice at more than this."

RESTRICTION OF OMNIBUS ROUTES.

At a meeting of local authorities in West Sussex, it was resolved to ask for a contribution of 3d. per mile from owners of public motor vehicles who desire to run on routes beyond those used on or before March 1, 1914. The surveyor of Horsham Urban Council has reported that such a contribution would not suffice to meet the cost, while Steyning West Council considers it to be excessive.

Linlithgow District Committee have declined to sanction a new route for the chars-a-bancs of the Edinburgh Motor Company at Queensferry.

Aldershot and District Traction Company have been refused permission by Horsham Council to extend one of its routes from Cranleigh to Horsham. Authority to run has been granted by the authorities concerned to a new service from Guildford to Bramley.

WOMEN AS MOTOR-CAB DRIVERS.—Although many women are driving motor cabs ordered from private garages, numerous local authorities have refused to license them as drivers of cabs plying for hire. Leeds is the latest instance, but the Military Tribunal have sent a recommendation to the Watch Committee in favour of licenses being issued.

ALTERNATIVES TO TRAMWAYS.

QUESTION UNDER CONSIDERATION AT CHESTER.

Chester Corporation, on September 27, on the motion of Alderman J. Jones, chairman of the Tramways Committee, adopted the following recommendations presented by that committee:—"That the city surveyor prepare a report, with full particulars and estimates of the work necessary to re-lay such portions of the tramway track as require to be renewed, giving in connection therewith full particulars of the work and expenditure which will be required to be incurred in respect of the streets and roads outside the tramway track to adapt them for modern traffic assuming that the tramway track is taken up and abolished; and that after the preparation of this report the electrical engineer prepare a report containing full particulars and estimates of the work required to renew and bring up to date the tramway undertaking, and to adopt alternative methods of traction."

In reply to a question, the Mayor (Ald. J. Frost) stated that the Tramways Committee would have no power to carry out any scheme. The matter would have to be decided by the Council.

The tramways, which were opened in 1903, have a route length of 3·50 miles and a total length of track of 6·4 miles. For the year ended March 31 last the accounts showed a surplus of £1,485 18s. 3d. as against a surplus of £903 7s. 5d. for the previous year. The increased surplus was mainly accounted for by the reduction in the power expenses, which for 1914–15 cost £2,250, averaging 1·50d. per car mile, and this year £1,828, averaging 1·30d. per car mile. A reduction of the price per unit charged by the Electricity Committee made a difference of £241 in the total cost for the year, and in addition a sum of £100 was allowed to cover the overcharge in previous years. The energy is derived from a hydro-electric installation on the River Dee.

The chairman of the Tramways Committee, in presenting the accounts, described the increase of £73 in the traffic revenue as being very gratifying when it was considered that the car mileage for the year was 30,727 miles less. The overhead equipment and the rolling stock had been kept in an efficient state of repair. A sum of £438 had been expended on repairs to permanent way as against £310. Had it been possible to obtain materials, more would have been done in this respect during the past year, but unfortunately they could not find labour nor the materials at any reasonable price to go on with at the present time. The reserve fund now stood at £6,557 15s. 3d., which represented 8 per cent. of the total capital expenditure.

NAPIER FOR A BUSINESS FIRM.

The accompanying photograph illustrates a 3½-ton model Napier business vehicle recently delivered to Roneo, Limited, makers of office appliances, etc., of High Holborn, London, W.C. As is well known, Napier business vehicles are being taken by the Government,

and permission can only be obtained for the sale of vehicles to firms engaged on Government work. Messrs. Roneo, Limited, are at present engaged on urgent Government requirements, and they felt the necessity of an efficient road vehicle which, in the present difficulties of transport, would supplement railway collection and delivery.

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MOTOR TRAFFIC.

BALANCED WINDOWS.

A Useful Contrivance for Rail and Road Cars.

A recent catalogue and leaflets issued by Beckett, Laycock and Watkinson, Limited, of Willesden, N.W., contain illustrations and descriptions of a number of useful inventions. These are all of proved merit, the utility of the contrivances having been demonstrated by the extensive use made of them by railway, tramway, road motor, and steamship undertakings. Now that tramway lines and roads are undergoing deterioration owing to the lack of labour and the difficulty of securing materials, the need for the accessories referred to has become pronounced. Especially is this so as regards motor cars and omnibuses.

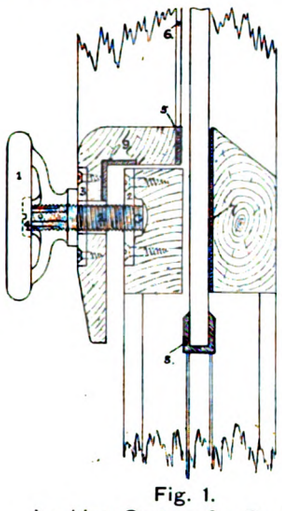

Fig. 1.

Fig. 2.

Locking System for Securing Window in Any Position.

The accompanying illustrations (Figs. 2 and 3) show closed and open windows to which the "Beclawat" balance has been applied. Fig. 1 is a sketch of the component parts of the tightening device for balanced sliding windows. This locking arrangement is operated by one or two turns of the handle, the effect being to place an even pressure completely round the glass in any position, thus eliminating rattle or noise due to the vibration set up by uneven rail or road surfaces. The device was first introduced for railway, tramway, and steamship traffic, and owing to its popularity the manufacturers were induced by various builders to bring out the fitting for motor vehicles. It has been widely adopted for motor cars and omnibuses, including vehicles operated by the Bath Electric Tramways Company and the Gateshead Tramways Company. The former company's conveyances are also fitted with the blinds manufactured by Beckett, Laycock and Watkinson, Limited, who have further supplied the Gateshead and other undertakings with ball-race runners for sliding doors.

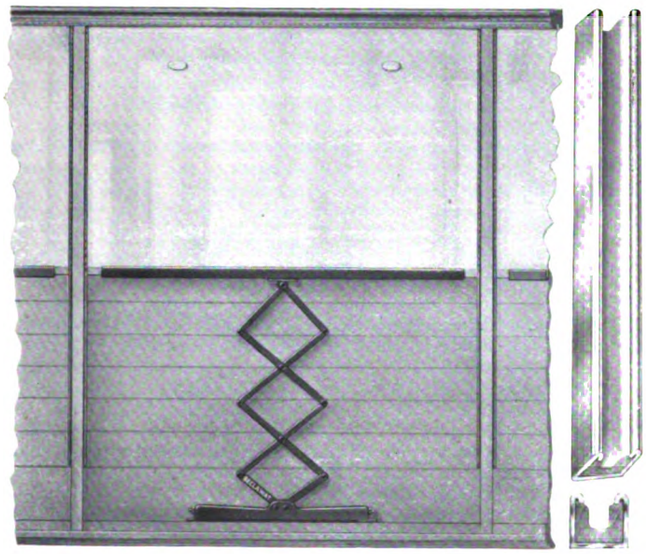

Fig. 3.—Each Balancer an Independent Unit.

Fig. 4.

One advantage of the balancer and window lift is that each window can be operated separately, thus obviating the use of expensive gearing. For doors and end windows the device can usually be arranged without cutting the woodwork. This is done by inserting it between the panels. When used for the top-deck windows of a tramcar, the springs are fitted a few inches from the car deck, so that the cleaning of the floor is not interfered with.

Another speciality, manufactured by Beckett, Laycock and Watkinson, Limited, and supplied by them to many motor body builders, is the "Beclawat" silent window channel. Among the uses to which this is applied is the prevention of rattling by windows and wind screens. An illustration of this fitting is given in Fig. 4. It consists of a special metal channel with a stout felt lining, which will not become detached or get out of place when fitted. It is very easy to fit, and may be let in flush or fastened direct on pillar.

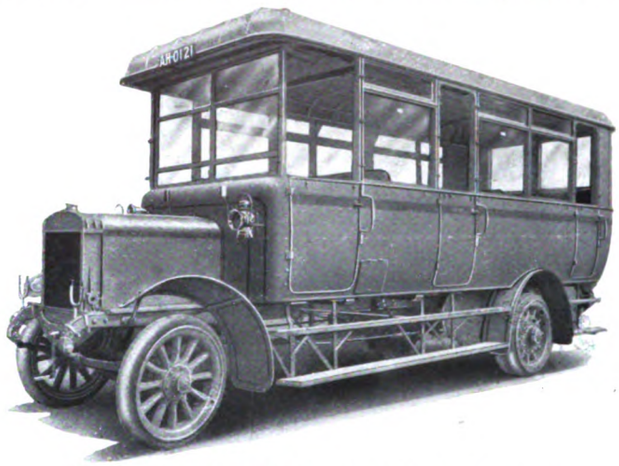

Fig. 5.—Omnibus Windows Fitted with Balancer.

COMMERCIAL VEHICLES OF GREAT BRITAIN.

The above headline is the title of an 84-page illustrated publication issued by the B. F. Goodrich Company, Limited, 117-123, Golden Lane, London, E.C., whose tires have achieved a high reputation. Illustrations, printing, and paper enhance the great value of the volume. The petrol, electric, and steam vehicles of 48 makers are dealt with, each machine and its specifications occupying a separate page. The idea is a unique one, and the manner in which it has been put into shape, despite the drawback of vehicle makers being engaged on Government work, is testimony to the spirit of enterprise that animates the B. F. Goodrich Company. On account of the war the firm have found it impossible to quote prices in this issue, but they hope to do so in a future volume. The present publication will, however, prove of great value to users and intending users of motor vehicles, for it enables them to institute a profitable comparison of the various types in order to decide which make of vehicle is likely to serve them best, and in which direction to look for further particulars. To broaden the basis of its appeal, and to bring it into closer harmony with its comprehensive purpose, the work includes the following articles, etc., dealing with the various aspects of band tire service:—(1) Weights of materials commonly hauled by commercial vehicles; (2) fundamental questions involved in changing from horse to motor delivery; (3) relation of tire equipment to cost of maintenance of commercial vehicles; (4) devices that make for commercial vehicle efficiency; (5) British standard rim diameters for solid tires for automobiles; (6 and 7) information concerning the Commercial Motor Users' Association; (8) traffic rules and regulations. There are also a list of Goodrich depots in Great Britain and Ireland, and post-cards (*a*) requesting catalogue from commercial vehicle manufacturers; (*b*) requesting Goodrich catalogue. Each chapter has its special value, but attention may be directed to three and four. So far as we are aware no publication has previously brought together illustrations and descriptions of mechanical aids for assisting loading, increasing carrying capacity, and expediting unloading.

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MOTOR TRAFFIC.

MOTOR TRAFFIC NOTES.

RUBBER SUBSTITUTE.—Mr. John Flint, of Sydney, claims to have succeeded in producing an efficient substitute for rubber at 5d. to 6d. per lb.

A CHESTER SERVICE.—Wirral Council having granted a licence, the Crosville Motor Company have restarted their service from Chester to New Ferry.

PORTSMOUTH TRAMWAYS MOTOR VEHICLES.—The road motor machines in use by the Portsmouth Tramways Department comprise a tower wagon and a general purposes wagon.

SUGGESTED ROAD CHARGE FOR YORK OMNIBUSES.—York Tramways Committee have deferred the consideration of the Streets Committee's request to contribute towards the upkeep of the roads used by their omnibuses.

LONDON GENERAL OMNIBUS COMPANY'S EMPLOYEES.—Men employed in the engineering and traffic departments of the London General Omnibus Company have been granted increases in their pay. The minimum rate for drivers is now 7s. per day, and for conductors 6s.

A PARIS OMNIBUS SERVICE RESUMED.—On the main boulevard from the Madeleine to the Bastille the Paris omnibus service has

45-h.p. 4-Ton Halley Lorry Supplied to a Firm of Millers at Chester.

been resumed. The vehicles are new ones, based on war experience. When the old machines were called up they were refitted with meat and troop transportation bodies.

WAR OFFICE CONTRACTS.—Recent War Department contracts include driving chains supplied by the Coventry Chain Company, Spon End Works, Coventry, and by H. Renold, Limited, Manchester, and non-skid chains for motor vehicles by the Parsons Non-Skid Company, Limited, Store Street, London, W.C.

MUNITIONS MECHANICAL TRANSPORT DEPARTMENT.—It is stated that this department is likely to remove to new offices at the Constitutional Club, which has been taken over by the Government. Sir Albert Stanley, the managing director of the London Traffic Group, is the director-general of the department.

MOTOR OMNIBUSES TO TRANSPORT SURVEYORS.—On the occasion of the holding of the annual meeting of the North Eastern District of the Institution of Municipal and County Engineers at Wath-upon-Dearne on September 30, the visitors were conveyed in motor omnibuses to inspect new work at Wath Wood reservoirs.

YORK SUNDAY SERVICE DISCONTINUED.—Owing to the shortage of the cleaning and overhauling staff the Sunday running of the electric omnibuses at York is to be discontinued for the present. The Tramways Committee have agreed to extend to the omnibuses the halfpenny fares for scholars when going to and from school.

MOTOR LORRIES SUPPLEMENTING A RUSSIAN RAILWAY.—A message from Petrograd states that a complete service of motor cars has been started between Petrograd and Archangel to supplement the railway. The road, over 600 miles in length, has been newly constructed for the purpose. The cars, mostly heavy lorries, were supplied from the United States.

CHARGING BATTERY VEHICLES AT CAPE TOWN.—The rate for charging battery vehicles at the Cape Town electricity station is 1d. per unit nett for energy supplied between 11 p.m. and 8 a.m. At other hours the ordinary tariff is in force. In his annual report, Mr. W. F. Long, the city electrical engineer, anticipates a large increase in the employment of electric vehicles.

OMNIBUS SCHEME AT CAERPHILLY.—A committee of the Urban Council are considering a proposal to run motor omnibuses, as the company now operating the services have refused to contribute to the upkeep of the roads. Councillor Salathiel, who suggested the scheme, has stated that there might be a way to secure the vehicles required without having to obtain a Provisional Order.

ACCIDENTS DUE TO RESTRICTED LIGHTING.—At an inquiry into the death of a person who was killed at Southwark by a motor omnibus, the driver was asked by Dr. Waldo, the coroner, what could be done to prevent so many deaths from street accidents at night. The driver suggested that the public should be allowed to cross streets only at fixed points, to be denoted by red lamps.

CONVEYANCE OF MUNITION WORKERS.—At the request of the Ministry of Munitions a motor omnibus service has been started from Streatham Common to Woolwich, via Penge, Bromley, and Chislehurst. In reply to an objection raised by Chislehurst Council, the London General Omnibus Company have stated that the service follows the route laid by the Ministry of Munitions. Single deck vehicles are used.

WOMEN CASHIERS FOR THE L.G.O. COMPANY.—In consequence of many of their cashiers having been called to the colours, the London General Omnibus Company is replacing them with educated women. Advertisements have recently appeared asking such women, between the age of 25 and 35 years, to apply to the L.G.O.C. Training School, Milman's Street, Chelsea, S.W. There has been a large number of applications, and after a period of training the substitutes have taken up duty in various depots.

BATTERY VEHICLE WORKING COSTS.—The 3-ton battery tipping wagon and watering tank supplied to Ipswich Town Council by the General Vehicle Company, Limited, ran 6,154 miles during the year ended March 31 last, and conveyed 9,000 tons of material. The inclusive cost of working, with allowance for maintenance and depreciation, was £396 10s. 7d. Of electric energy 7,961 units were used at 1d. per unit. Mr. Mead, the borough engineer, described it as reliable, economical, and simple to drive.

C.A.V. CAR LIGHTING SYSTEM.—C. A. Vandervell & Co., Ltd., of Acton, W., have published an artistically-printed abridged catalogue of 20 pages. This illustrates and describes the dynamo car-lighting system, which is referred to as "simple, safe, and certain." It is installed on many omnibuses, motor cars, and the London County Council's trailer cars. Car illumination by electricity is pre-eminently associated with the name of C. A. Vandervell & Co., who give a guarantee against defects of manufacture. Two pages are devoted to C.A.V. electric horns and klaxon horns.

DUNLOP COMPANY'S NEW MILLS.—The Dunlop Rubber Company have acquired the business premises previously carried on by Tire Yarns, Limited, and Fabric Weavers, Limited, two of the largest mills in the Rochdale district, for the manufacture of cloth for the company. The transference of the premises to the Dunlop Rubber Company has been marked by a generous gift by the directors of the two companies and the present owners. As soon as the deeds had been signed it was suggested that a subscription list should be opened for the benefit of auxiliary military hospitals in the district, and in a few minutes the sum of £1,400 was subscribed.

MILITARY CLAIMS ON OXFORD OMNIBUS COMPANY'S STAFF.—On the ground that they were urgently required to maintain the motor omnibus services, absolute exemption from military service was applied for at Oxford for 26 employees of the Electric Tramways Company by Mr. A. H. Tyler, the general manager. One was the traffic superintendent. Mr. Tyler stated that but for the fact of the supply of petrol having been cut down nearly 50 per cent., and the consequent reduction in the number of omnibuses running, the company would be much more seriously embarrassed than it was. At present, owing to shortage of drivers, men were working overtime, and the inspectors frequently had to act as drivers. Regarding the night foreman in charge of the workshops, it was said that his duty was to superintend the repairs. The military representative asked if the manager could not undertake the work of the traffic superintendent, and Mr. Tyler replied, "Certainly not." Mr. H. Holmes, engineer, said they had applied to the Labour Bureau ever since the war began to get skilled men without success. All the men were exempted so long as they remained in their present occupation, except three (whose cases were adjourned for a month for the men to be examined by the Medical Board), and the night foreman was exempted for two months.

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THE

Tramway & Railway World

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ANNUAL SUBSCRIPTION (Postage Prepaid)—In the United Kingdom, 25s.; for all places abroad, 30s.

Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

LONDON: INDIA OFFICE.

The Secretary of State for India in Council is prepared to receive tenders, from such persons as may be willing to supply—

(1) Dog Spikes.
(2) Fish-bolts.

The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W., and tenders are to be delivered at that office by two o'clock p.m. on Tuesday, October 24, 1916, after which time no tender will be received.

G. H. COLLIER,
Director-General of Stores.

Whitehall.
October 12, 1916.

BURY CORPORATION.

The Corporation of Bury invite tenders for the supply of 70 winter coats for female conductors.

Forms of tender may be obtained, and sample inspected, on application to the General Manager, Central Tramways Offices, Market Place, Bury.

Tenders to be delivered to the Town Clerk, Bury, not later than 10 a.m. Monday, October 23, 1916.

POSITIONS VACANT.

COUNTY BOROUGH OF WIGAN.

APPOINTMENT OF BOROUGH ELECTRICAL ENGINEER AND MANAGER.

The Corporation of Wigan invite applications for the position of Borough Electrical Engineer and Manager.

Applications, endorsed "Borough Electrical Engineer and Manager," and accompanied by copies of three testimonials of recent date, stating age, qualifications and experience, must be sent so as to be in the hands of the undersigned not later than October 19.

Particulars of the duties and of the terms and conditions attaching to the appointment may be obtained on application to me.

WILLIAM HENRY TYRER,
Town Clerk.

Municipal Offices,
King Street West, Wigan.
September 22, 1916.

REDDITCH URBAN DISTRICT COUNCIL.

ELECTRICITY DEPARTMENT.

STATION SUPERINTENDENT.

The above Council is prepared to receive applications for the temporary position of Station Superintendent at a salary of £3 per week, previous 3-phase experience with turbo-generators and water-tube boilers essential.

Application, in candidate's own handwriting, stating age, experience, and the earliest date duties could be taken up, together with not more than three recent testimonials, to be addressed to the undersigned before October 24, 1916.

GEORGE W. HOBSON,
Clerk to the Council.

MALVERN URBAN DISTRICT COUNCIL.

SHIFT ENGINEERS.

Wanted immediately, for duration of war, two Shift Engineers: Single-Phase A.C. Steam Plant, 8-hour shift. Ineligible for Army.

Apply by letter, stating age, experience and wages required, to Chief Engineer.

MUNICIPALITY OF PORT ELIZABETH (SOUTH AFRICA).

ELECTRICITY DEPARTMENT.

Wanted, Works Electrician (ineligible for military service), capable of taking charge, under a superintendent, of all the electrical plant and apparatus about the works and of testing and maintaining the same. He should have experience of both alternating and direct current and of armature winding. Wages 12s. per day. Third class passage paid out. Three years' agreement. Applications, stating age and qualifications, and accompanied by copies of recent testimonials, to be sent immediately to the undersigned.

DAVIS AND SOPER, LTD.,
Agents of the Municipality of Port Elizabeth.
54, St. Mary Axe, London, E.C.

SPENBOROUGH URBAN DISTRICT COUNCIL.

CLECKHEATON ELECTRICITY WORKS.

SWITCHBOARD ATTENDANTS.

Wanted, capable Switchboard Attendant, used to 3-wire D.C. and traction supply; wages 30s. per week and 2s. per week war bonus. No person eligible for military service need apply.—Application to the CHIEF ENGINEER, Electricity Works, Cleckheaton.

CAR BODY PAINTER.

Required, Car Body Painter, all round man, ineligible or above military age. Will be required to act as motorman when necessary.—Apply, ENGINEER AND MANAGER, Electricity Works, East Street, Barking.

ENGINEER-IN-CHARGE.

Engineer-in-charge required for period of the war. Salary £3 5s. per week.—Apply to Mr. G. G. Bell, Hammersmith Borough Council, Electricity Department, 85, Fulham Palace Road, Hammersmith, W.

ADMIRABLE SITES FOR WORKS, FACTORIES, ETC.

The Great Central Railway passes from the Metropolis northwards through the centre of industrial England, throwing out its branches eastward and westward to the coast. Its lines run over the great coalfield which extends into the counties of Yorkshire, Nottinghamshire, Derbyshire, and Lincolnshire, thus affording an easily accessible source of fuel supply.

This coalfield is the largest in the British Isles, and was estimated by the Royal Commission on Coal Supplies (1905) to cover not only an area of approximately 4,066 square miles, but also to contain not less than forty-nine thousand million (49,000,000,000) tons of coal. The Lancashire and North Wales Coalfields are also traversed by the Company's lines.

The new eastern port of Immingham should particularly attract traders, as its modern equipment and accessibility at any time of the day or night, irrespective of tides, are important time and labour saving factors.

Adjoining the Great Central railroad at various parts of the system are situated Valuable Sites for Works, where, by the introduction of siding accommodation, goods can pass right into and directly out of the works, which greatly assists the manufacturer to attain his desired position in the world's markets.

For information please communicate with the G.C.R. Publicity Office, 216, Marylebone Road, London, N.W.

Owners and agents of land and buildings for sale or to be let near the Great Central Railway are requested to send particulars to the G.C. Estate Office, 12, Paton Street, Piccadilly, Manchester.

SAM FAY, General Manager.

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"TYNE METAL" BRAKE SHOES
HARD WEAR RESISTING.
GOOD BRAKING EFFECT.
GUARANTEED CHEAPEST PER CAR MILE.
Sole Manufacturers:
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SKINNERBURN ROAD.
NEWCASTLE-ON-TYNE.

TRAMWAY SUPPLIES, Ltd.,
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160, WOODHOUSE LANE, LEEDS.
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TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controllers, Leeds." Telephone: 3488 Leeds.
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For Places Abroad—Thirty Shillings per annum.

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VARNISHES
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(NATURAL, GLAZE, DULL FINISH, OR COLOURED)
in twill, straight, or fancy weaves, canvas backed or unbacked, is
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THE
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SATURDAY, OCTOBER 14, 1916.

SAFETY AMID DIFFICULTIES.

With the extension of the restricted lighting of streets and vehicles to the whole country the fall of the year is being marked with a distressing number of fatalities and injuries inflicted upon pedestrians by various classes of vehicles. Omnibuses and tramcars figure largely amongst them, and as in one town accidents have continued to occur after the tramway manager had issued notices calling the attention of the public to the need for caution in crossing the streets, the question of what further measures can be taken is a pressing one. Attention must first be paid to the point whether the warning notices are given a sufficiently wide circulation. No manager ought to rest content with displaying them on the cars, depôts, garages and shelters. The most effective form of advertising for such a purpose is the newspapers, in which the advertisement should be given the accompaniment of a news-paragraph which will often be read by one member of a family to the others. In many towns an editor will send a reporter to interview the traction manager for the purpose of working up the details into a special article. So great is the importance of the matter that the manager should not wait to receive the request but extend the invitation himself. An example in newspaper publicity work has been set for some years by the London General Omnibus Company, in furtherance of their policy of inducing traffic. When the company entered upon the safety first campaign the newspapers became the primary means for the education of the public, especially when the lighting restrictions came into force. Very few Londoners have not been reached by the company's announcements that both in hailing their vehicles and in crossing a road a person should stand beneath a lamp. There are many towns in which the special circumstances of the present time form a justification for establishing a permanent organisation with the object of increasing the safety of the streets. The tramway or omnibus manager and the local automobile club might take the lead in bringing into existence a bureau of public safety. The lines upon which this may be done are shown in the case of Portland, Oregon, where two years ago the Mayor appointed a public safety commission, the membership comprising prominent business men, traction, education, police, and fire officials, a newspaper representative, and a medical practitioner. The campaign was begun in the schools among 35,000 scholars, in whose minds the principle of safety first was instilled. Next there were appeals to the home life and vocational activities to suppress the "chance taker" and to eliminate dangerous conditions. Every assistance was given by the newspapers, and the authorities co-operated in initiating corrective measures. The chairman of the commission has recently presented some information dealing with the work accomplished during the past six months, from which it appears that there were 256 traffic collisions of all kinds, 108 cases in which pedestrians were struck by vehicles, five persons killed by automobiles and one by a tramcar, 148 injured by automobiles, and 21 by tramcars. The few fatalities are referred to as being a very creditable showing as compared to the monthly death roll in Seattle of 5; San Francisco, 11; Chicago, 45; Detroit, 30; and New York, 50.

TRAFFIC DURING RESTRICTED LIGHTING.

Extraordinary complaints come from the Lanarkshire Tramways Company. Their secretary has informed the county police, the Home Office and the Ministry of Munitions that in widely separated places the car employees, the majority of whom are young women, have been assaulted, threatened and interfered with by gangs of young men. Some of the women conductors are so intimidated that they threaten to leave. In addition to being struck by stones, potatoes and sticks thrown at them on lonely parts of the route in the dark, one woman had a live cat thrown at her. Another complaint is that passengers have refused to pay fares or excess fares when the ticket inspectors have been passed. There has also been rushing and overcrowding of cars, and refusals to leave the same when requested. Intoxicated persons have forced their way on, and wilful damage to the vehicles and equipment is alleged. The company have informed the authorities referred to that if the present conditions are not discontinued they must withdraw the early morning and evening cars, as they cannot risk the limbs and safety of their employees and passengers. While the police have promised to give every possible assistance, it is recognised that their strength has been reduced owing to enlistments.

Burton Corporation Tramways Committee have adopted the general manager's suggestion that on Saturday evenings the last car from each terminus should leave about 9 p.m., as is the case on other week nights. The service on other nights is to be less frequent.

Asked if the light in the Manchester cars could not be diffused through the car, as in the cars in surrounding towns, instead of being confined by a shade, Mr. J. M. McElroy has stated to an interviewer that there has been difficulty in devising a method of lighting to satisfy the police. He added that he would be glad to see the cars again flooded with light, as nothing attracted passengers better than a brilliantly-lighted comfortable car.

On account of the curtailed lighting at Halifax, the Tramways Committee are considering the desirability of reducing the service in the later part of the evening.

The tramways authorities in the Haslingden district have discontinued the extremely late cars, with the result that the last cars now reach the depôt an hour earlier. A local newspaper suggests that the public would not complain if the service were curtailed by another hour, as the cars are still running at the same time as was the case under the Summer Time Order, while very few people are using them.

Conductors at Bournemouth use a small electric glowlight, attached to their coat, enabling tickets and money to be easily seen. When not in use it is extinguished.

Unfortunately there have been further cases of pedestrians being killed and injured by cars during darkness. At an inquest held at Burnley, Mr. H. Mozley, the tramways manager, expressed the sympathy of the Tramways Committee with the relatives. Undoubtedly the man, he said, was a victim of the war. The condition of the streets required that everyone should keep a very careful look-out.

In a Coventry fatality Councillor H. W. Wale, vice-chairman of the Tramways Committee, expressed the regret of the committee that the accident should have happened, and the jury recorded their sympathy with the motorman in having been involved in an unavoidable accident. The coroner remarked that last year eleven and a quarter million people travelled on the cars, and there was no fatality. The department were to be congratulated upon this in view of the circumstances under which they worked in these days.

A verdict of accidental death was returned in two cases of fatal injury at Newcastle, and one each at Bradford and Sheffield.

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ARCING AND TRAFFIC DURING RAIDS.

From the General Headquarters, Home Forces, Whitehall, S.W., the following letter, dated October 3, signed by "H. De Watterville, Major, General Staff," has been received at Walthamstow:—"With reference to your letter of September 25th, regarding the sparking from trams, stringent regulations have been issued by the Commissioner of Police of the Metropolis to all tramway companies and employees in the event of an air raid. It is confidently believed that these regulations will lead to the elimination of sparking from electric tramways."

A movement has been in existence at Walthamstow and Leyton to secure the cessation of tramway and omnibus traffic when warning of an air raid is received. Walthamstow Council have supported by resolution a petition which is to be presented to the authorities. Leyton Council at their last meeting rejected a resolution in support of the proposals, but left the matter in the hands of the manager and chairman until the Tramways Committee have had time to consider it. Councillor F. M. Read, chairman of the committee, observed that occasional arcing of the overhead wires could not be prevented. The manager acted in accordance with regulations issued by Lord French so recently as September 20. His lordship did not approve of the immediate stoppage of cars, but as soon as notice was given the speed was reduced. When warning of a raid was given the previous evening, the department, without consulting inter running authorities stopped cars from West Ham and London coming into the district, and turned their own cars into the depôt.

Ilford Council have been informed by their tramways manager that the cars are working under the jurisdiction of the Metropolitan Police, who laid down exactly what they were to do in regard to the lighting of the cars and the speed they should run. The Council left it to the chairman of the Tramways Committee and the manager to see what can be done in regard to stopping the cars when a warning is received. The manager has already adopted that course when warning is given late at night.

Complaints having been received from the military commander as to the lighting of the Hull cars, the chairman, deputy chairman and the manager have been deputed to interview him and ascertain the exact nature of his requirements.

In reply to a suggestion that the Oldham cars should be provided with blinds, to be drawn when the vehicles are waiting to enter the depôt, the manager has stated that there is an arrangement to turn off the energy supply when an intimation is received that an airship is within a certain radius. The curtains were abolished for hygienic reasons, and if they were used at night the passengers would be pulling them apart to look for their destination.

EDINBURGH TRAMWAYS.

An interesting development in connection with the Edinburgh tramways was reported on Wednesday The Tramways Company before proceeding with some reconstruction work which the Edinburgh Town Council press them to undertake, had to apply for sanction from the Ministry of Munitions. As a result they were informed that an expert from the Ministry would visit Edinburgh to inspect the work proposed to be executed, and it is understood that he will sanction only what is essential for public safety. The Tramways Company have practically completed such repairs as they consider necessary, and it will be interesting to see whether additional work is passed by the Ministry as desirable and necessary.

A summary has been issued of the report prepared for Edinburgh Tramways Committee on the system of traction to be adopted when the Tramway Company's lease of the cable tramways expires. The authors of the report are Mr. J. B. Hamilton, general manager, Leeds Corporation Tramways; Mr. J. A. Brodie, permanent way engineer and city engineer, Liverpool; and Mr. Campbell, city engineer of Edinburgh. The main question which the experts were asked was whether the new system of tramways could be running in Edinburgh six hours after midnight, June 30, 1919, without the city having received any facilities from the company. The answer is in the affirmative. The system recommended is the overhead electric system. It is cheapest and most convenient, and, they point out that it lends itself not only to extensions into the country but also to linking up with other systems already in existence—for instance, with Musselburgh, giving through access as far as Port Seton, and with Leith.

The report states that it is not advisable to continue the use of the cable tramways for any part of the city on the expiration of the lease, and it observes that if electric cars are run on the existing rails the maximum speed could not be obtained. It is recommended that power should be obtained from the station to be erected at Portobello. In regard to amenity, the experts state that they recognise that the question of overhead wires in the central part of the city will probably be debated. They suggest, however, that the point really comes down to what can be tolerated in Princes Street, although in "the central part of the city" they include the Bridges and Lothian Road. For Princes Street they recommend that, before introducing the conduit, overhead wires should be installed on the south (or Gardens) side where it will be largely hidden by the foliage of the trees. The object of this arrangement is to make possible the running of a complete electrical system immediately on the expiry of the lease. The work on the overhead system can be proceeded with without interference with the running of the present system, and without the company's consent. The work of laying the conduit system in the first instance would be impossible without that consent, and this would involve delay. It is suggested that if, after practical experience of the temporary arrangement in Princes Street the citizens make up their minds that they will not have it, the overhead can be taken down and something else substituted, probably the conduit.

MUNITIONS TRIBUNAL APPLICATIONS.

The decision of a recent Local Munitions Tribunal, held in Glasgow, at which test cases were put forward by two Glasgow Corporation Tramway workmen, was issued by Sheriff Fyfe, on October 5. Complainers claimed clearance certificates in respect that they were not paid time and half for four days of the usual holiday period at Glasgow Fair. In a note, his lordship states that the complaints in this case were rather of the nature of a friendly litigation to settle an important question of principle. The men did not mean actually to leave their employment at the Coplawhill car works. All they sought was to have affirmed their right to obtain clearance certificates in order that they might obtain what was a corollary of that right, namely, compensation for having been refused leaving certificates. The decision of the Tribunal is that the complainers were entitled to leaving certificates, but leave to appeal was granted. The case affects about 1,000 workmen engaged in the manufacture and repair of cars and other work in connection with the tramway system. In securing certificates the men secure the right to compensation at the rate of extra half-time for four days.

The North Staffordshire Munitions Court heard an application by a conductor employed by the Potteries Electric Traction Company for a leaving certificate to enable him to return to his former occupation of a potter's printer. Applicant had been a conductor for a period of 13 years, and in April last he returned to his old trade. This work affected his health and he re-entered the Traction Company's employment, but was paid at the beginners' rate of 5*d.* an hour instead of 6*d.*, which he previously received. The tribunal granted the application, the chairman observing that the point was whether or not the company was an establishment within the meaning of Section 7 of the Munitions Act. When a previous application was made they produced a certificate from the Ministry of Munitions, which was granted apparently on the assumption that light, heat, and power were being produced. That certificate, however, appeared to have been withdrawn, and the certificate upon which the company relied depended on the supply of tramway facilities. On the point of law he should be pleased to give them leave to appeal to the Central Munitions Court, as it was an important matter, and the company would no doubt like it settled. A leaving certificate would be granted to the applicant because having regard to his previous service, the tribunal felt that the company had not paid him a proper rate of wages on re-entering their employ.

THE DEMANDS OF LABOUR.

The recently-constituted department under Mr. A. Henderson, M.P. Labour Adviser to the Government, is now in operation at the new Government offices in Great George Street, Westminster. With the object of laying the foundation for a regular and definite system of co-operation and communication between industry and the Government, consultative committees of employers and trade unionists have been appointed, with a separate consultative committee on women's labour. Other committees will deal with colonial and international problems affecting labour, and with general social and economic questions. It is not proposed that these committees should act in any representative capacity. Where it is necessary to consult any industry, from either the employers' or workmen's standpoint, opportunity will be given representatives of industry to submit their views.

Glasgow Corporation have received a deputation from the local branch of the United Suffragists. The speakers urged that equal pay for equal work should be given to men and women employed on the tramway service. They pointed out that in April, 1915, when the Council agreed to employ women it was generally understood that women doing the same work as men would be paid the same rate of wages. Women conductors were at present being paid a minimum of 27*s.*, and reached a maximum of 28*s.* after six months' service, plus the war bonus of 1*s.* granted in September last. Men were paid a minimum of 29*s.* and reached 34*s.* or 35*s.* after a few years. With the war bonus added the minimum was brought up to 31*s.* It was argued that the differentiation would create dissatisfaction among the women. The Lord Provost assured the deputation that their views would have sympathetic consideration, and the Council referred the matter to the Tramways Committee.

The 54-hours week reverted to on the Glasgow tramways for the remainder of the period of the war, in order to meet the shortage of staff, came into operation on October 9. The addition of three hours to the working week entails only about a quarter of an hour extra for each of the two shifts per day, and both the men and women receive pay at the rate of time and a half. Meetings of employees are being held for the purpose of passing a resolution asking for the payment of the same rate of bonus to the women as to men. Efforts are being made to form branches of the Municipal Employees' Association at the various car depôts.

Aberdeen Tramways Committee have granted motormen, male conductors, and cleaners an advance of ½*d.* per hour all over. The increases will work out as follow:—

	Motormen.		Conductors (male).			Cleaners.	
	Present rates.	Future rates.	Present rates.	Future rates.		Present rates.	Future rates.
1st year ..	5½*d.*	6*d.*	.. 5*d.*	5½*d.*	.. 1st class	5½*d.*	6*d.*
2nd year ..	6*d.*	6½*d.*	.. 6*d.*	6*d.*	.. 2nd class	6*d.*	6½*d.*
3rd year ..	6½*d.*	7*d.*	.. 6½*d.*	6½*d.*			
4th year ..	7*d.*	7½*d.*	.. —	7*d.*			

The present weekly wages, including war bonus, of motormen in the first year of service amount to £1 9*s.* 6*d.*; now these men will receive £1 11*s.* 11*d.* The motormen in receipt of the maximum rate of pay (four years' service and over) will now get £1 17*s.* 10*d.*, including

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war bonus, instead of £1 15s. 5d. Male conductors in the first year will be paid £1 9s. 6d. per week, including war bonus, instead of £1 7s. 2d., and those with four years' service and over £1 16s. 7d., the present average being £1 14s. 3d. First-class cleaners will get £1 14s. 8d., in place of £1 12s. 3d., and second class cleaners will advance from £1 9s. 10d. to £1 12s. 3d. The wages quoted for motormen and conductors are average figures, the amount varying according to the hours worked.

Bournemouth Corporation have granted an increase of 2s. per week on the war bonus paid to married tramway employees. An application for payment at the rate of time and a quarter for overtime work has not been granted. The general manager reported that owing to the heavy traffic during the past six weeks a large amount of overtime was worked, but it was recognised that the additional amount earned would help to meet the increased cost of living. He would arrange as soon as the heavy rush of traffic ceased to reduce all overtime to a minimum. Including the payments made to dependants of men serving with the colours the charges on account of the war represent over 50 per cent. of the nett yearly balance on the working of the tramways before the war.

The chairman of the Bradford Tramways Committee on October 10 moved the adoption of the committee's recommendation to report to the Board of Trade, in accordance with the provisions of the Munitions of War Act, the application of the employees for increases of wages entailing an outlay of £21,000 a year. Councillor Palin, secretary to the men's union, moved that the report be deferred back as incorrect, the resolution adopted by the committee having referred the question to the Committee on Production and not to the Board of Trade. The Munitions of War Act was passed in order to prevent strikes, and he contended it was an insult to the men to say that any difference had arisen or could be apprehended. Councillor Priestly said he was willing to meet the men's deputation again, and he therefore withdrew the report.

NEW BY-LAW REGARDING FARES.

Doncaster Corporation have adopted the following by-law suggested by the Tramways Committee in place of the existing by-law No. 9, namely :—"Each passenger shall, either on demand or before leaving the car (whichever first happens), pay to the conductor or other duly authorised officer of the Corporation, the fare for his journey, and shall obtain a ticket therefor. Any person leaving a car shall be deemed to have completed his journey." The necessary application is to be made to the Board of Trade to approve the same and repeal the existing by-law.

A fine of 30s. was imposed on a passenger at Ystrad on October 9 who had ridden on a Rhondda tramcar beyond the distance for which his ticket was available and had refused to pay an extra halfpenny which was due.

In a prosecution at Newport for alleged avoidance of payment of fare, it was stated for the prosecution that insufficient fares were sometimes paid, and sometimes they were not paid. Baskets of fruit were carried to defendant's shop, and fruit was given to the conductors. In this case the conductor said he forgot to ask for the fare after a basket had been put down ; and the Corporation solicitor stated that the fare should have been paid even if not demanded. Defendant said she paid 10s. and 15s. a week in fares, and she had no recollection of this particular occasion. The Bench ordered payment of costs, no conviction being recorded.

MISCELLANEOUS NEWS AND NOTES.

Track Doubling at Rotherham.—The tramway track in Westgate is being doubled by the Tramways department.

The Need for Cattle Lights.—A few days ago a Carlisle tramcar at 8.25 p.m. ran into a drove of cattle on Eden Bridge. One animal was killed.

Heat Curtailment on German Trains.—Notification has been given that it will no longer be possible to supply sufficient steam-heat in passenger trains in Germany.

Temporary Stoppage at Liverpool.—On account of the breakdown at the power station, the tramway services in the centre of Liverpool were at a standstill from 5.5 to 7.28 p.m. last Saturday.

The London Electric Railways Company have obtained an extension of the time allowed in the act authorising the purchase of lands and the construction of the Edgware and Hampstead Railway.

Aberdeen Tramways Military Record.—The Military Tribunal at Aberdeen have been informed that 75 per cent. of the staff of the Corporation Tramways department are serving with the colours.

Passengers and the Car Bell.—Wallasey Tramways Committee are reconsidering their prohibition of passengers pulling the bell in order to stop or start the car. Probably they will be permitted to stop the car but not to restart it.

Utilisation of Waste Steam.—Ilford Council have asked the Local Government Board to sanction the borrowing of £10,000 for the provision of plant for the utilisation of the steam at the refuse destructor for the purposes of the electricity station.

Route Numbers.—Complaints having been made that it is impossible to tell from the indicators the destination of the Oldham cars, the number system is to be adopted. The manager had prepared a number of boxes in anticipation of the change being agreed upon.

Newcastle Tramways Assessment.—The Tramways Committee have withdrawn their appeal against the assessment of the tramways, the Assessment Committee having agreed upon the figure of £40,606, instead of £50,000. The former amount is that for which the Tramways Committee had contended.

German Railwaymen Called to the Army.—It is reported that every railway district in Germany has been ordered to place at the disposal of the military authorities a fixed number of suitable men whose place must be taken by women. In the railway district of Essen alone 15,000 men will have to be produced.

Cars for Sheffield and Rotherham.—Sheffield Tramways Committee are seeking the sanction of the Treasury to expend £35,000 for the purchase of 25 new tramcars, for which it is proposed to invite tenders at an early date. Rotherham Council have asked the Board of Trade to sanction the purchase of 12 tramcars from Oldham Corporation.

Panic Among Passengers.—While ascending a hill at Pentae, Rhondda, on October 9, a tramcar containing workmen began to run backwards. The passengers became alarmed and some endeavoured to rush out of the car, thus preventing the woman conductor putting on the brake. The car was brought to a standstill within a distance of 150 yards.

Car Runs Back at Leeds.—Owing to the failure of the power a car, on reaching the top of Beeston Hill on the evening of October 10, began to run back. The driver of an oncoming car noticed the mishap and at once began to run his car backwards, thus greatly reducing the amount of damage caused by the runaway car crashing into it. A few passengers were slightly injured.

Tramway Material Required.—Tenders will be opened at noon on November 24 at the "Dirección General de Obras Públicas, Ministerio de Fomento," Madrid, for the construction and working, for a period of 60 years, of an electric tramway in Saragossa. The carrying out of the works, says "The Board of Trade Journal," may involve the purchase of material from outside Spain.

Running Powers at Blackpool.—When the lease of the tramway between the Grand Hotel and Squire's Gate to the Blackpool, St. Anne's and Lytham Tramways Company expires in July next, the Blackpool Tramways Committee propose to take over the section. The company have made an offer for running powers on this line, and also from the Central Station to the Grand Hotel.

More Petrol Available.—Owing to the limitation of the petrol supply the omnibus service between Barnsley, Goldthorpe, and Doncaster was recently withdrawn by the Barnsley and District Electric Traction Company. The service has now been restored on four days per week. The Birmingham and Midland Motor Omnibus Company have partly resumed their service to Dudley.

Taking up Rails to use Elsewhere.—In consequence of the high price of rails, the London United Tramways Company have decided to take up the rails of the track in Lower Boston Road, Hanwell, in order to repair other sections. The Lower Boston Road route is at present unused, and the Hanwell Urban Council have acceded to the company's request not to consider their action as an abandonment of the line. The company intend to reinstate the line within two years of the termination of the war.

A Paraffin Carburetter.—It was announced by Mr. S. Smith at the annual meeting of S. Smith and Sons (Motor Accessories), Ltd., that the company had introduced a successful paraffin carburetter, which enabled cars to be run quite satisfactorily upon 80 per cent. of paraffin and 20 per cent. of petrol. The running was not attended by any of the disadvantages hitherto associated with the use of paraffin. The carburetter was purely automatic ; it had no complications and could be fitted to any engine.

Birmingham Services to be Curtailed for Three Weeks.—In consequence of a breakdown at Nechells power station, the Birmingham tramway services are to be curtailed for probably three weeks. The difficulty first arose for half an hour on October 10, and on the following day there were two stoppages, the second of these lasting from 2.20 p.m. to 6.15 p.m., the trouble being due to the fracture of a shaft of a turbine engine. The Tramways department have arranged for the normal services to be run until 7.30 a.m., but from that period until 9.30 a.m., and again between 5 and 6.30 p.m. there will be restricted services.

Hull Motormen Arrested.—Two motormen employed on the Hull Corporation Tramways were arrested on October 10 for failing to report themselves to the military authorities under the provisions of the Military Service Act. They pleaded not guilty, and asked for an adjournment to instruct a solicitor. They had both been before the Appeal Tribunal, had been exempted from combatant service, and expected the tramways manager would have arranged with the military authorities for the exemption of motormen. Lieut. Runton said the defendants had been through every appeal court, and had been exempted from combatant service. The Corporation had made no claim for their motormen as indispensable. A remand of eight days was granted.

A Doncaster Tramway Difficulty.—Owing to an objection raised by Bentley Urban Council to a crossing being constructed in front of the church, there has been an interruption to the work of relaying the Doncaster Corporation tramway to the mining district of Bentley. To place the crossing at the spot where the District Council desire that it should be would cost £300, and the Corporation have stopped the reconstruction. Travellers between Bentley Village and the New Colliery Village have to change cars. The Board of Trade have offered the service of Colonel Druitt as arbitrator, which Bentley Council agreed to accept, but the Corporation have refused to fall in with that suggestion. The Corporation consider that to meet Colonel Druitt and then not be prepared to accept his suggestion as a solution of the difficulty would be an insult to the Board of Trade.

Provisional Order Limitations.—The Parliamentary Agents' Society have made representations to the Board of Trade asking for a partial relaxation of the stringent limitations on Provisional Orders now enforced as a measure of national economy. In reply the Secretary of the Board of Trade has stated that they are to entertain applications for Provisional Orders in the ensuing season when the promoters can show that the establishment of works under the schemes proposed will be proceeded with as soon as practicable after the termination of the war. The Board will have particular regard to the considerations as to how far the exercise

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of the powers will provide an outlet for labour or for the utilisation of plant and machinery that have been provided for the purposes of the war. At the same time the Board consider that it is undesirable for local authorities to put forward proposals likely to provoke serious opposition or to prove unduly costly.

Damages Awarded an Omnibus Driver.—At Bow County Court the driver of a motor omnibus was awarded £55 damages with costs against West Ham Corporation for personal injuries. The evidence showed that at Burnham Street tramway junction a tramcar belonging to the Corporation began to turn into that thoroughfare owing, it was alleged, to the points not being properly set. The car collided with an omnibus driven by plaintiff, who had his arm badly strained in manipulating the steering-wheel, and had to be absent from work for six weeks. The motorman did his best to avert the collision. Prior to the mishap another car had been turned into Burnham Street, and plaintiff contended that there had been negligence on the part of the conductor in not seeing that the points were properly replaced, so that other cars could proceed along the main road. The defence was that a heavy fall of rain must have washed mud between the points, preventing them from closing but Judge Graham advised the jury that as this had not been proved it was a mere surmise.

L.G.O.C.Safety Campaign.—An admirable idea has been adopted by the London General Omnibus Company with a view to stimulating the interest of their employees in the "Safety First" campaign. It is an order of merit chart showing the positions of each of the 25 garages in regard to the number of accidents per 10,000 miles' run in 1916 as compared with 1915. The chart is exhibited in the garages, and Mr. H. E. Blain, the operating manager, has had it reduced in size for reproduction in the company's weekly traffic circular, so that the employees can study it at their leisure. The innovation should certainly exert a beneficial influence by inducing the drivers and conductors to strive to place their garage in the premier position. This is now held by Mortlake, with a record of 1,483 accidents per 10,000 miles, as compared with 1,797 in 1915. For the whole of the garages there is this year a decrease of 24.8 per cent. in accidents per 10,000 miles as against 1915. The chart is in the form of a staircase, and there is a well-worded expression of approval of the Mortlake figures and an exhortation to other garages to "step up to safety." In one corner is the inscription, "When in doubt take the safe course."

PERSONAL.

Mr. A. M. Strachan, traffic superintendent, Doncaster Corporation Tramways, has resigned that position.

Mr. W. W. Bell, chief clerk, Yarmouth Corporation Tramways, has been granted a bonus of £10 per annum during the war.

Mr. A. M. Simpson has been appointed general manager of the Malta Tramways Company's undertaking in Valetta and district.

Mr. J. C. Williams, electrical engineer and tramway manager of the Erith Urban District Council, has been granted £50 for extra services rendered since his appointment.

Corporal J. Richardson, of the York Tramways Electricity undertaking, has been congratulated by the Corporation on receiving the award of the Military Medal.

British Thomson-Houston Company, Ltd.—At a recent board meeting of this company, Mr. J. F. Nauheim retired from the chairmanship. The managing director, Mr. H. C. Levis was appointed chairman, and he retains the managing directorship of the company.

Second Lieutenant A. R. Courtenay, until recently acting manager of the publicity department of the General Electric Company, Ltd., has been promoted to full lieutenant. After nine months' service in Egypt and Salonika he was invalided home with dysentery, but has now recovered.

Mr. L. Slattery, the new general manager of West Ham Corporation Tramways, attended a tea and entertainment given by the employees to a party of wounded soldiers at the car depot. Mr. Slattery made a few remarks, in which he complimented the employees and thanked the soldiers who had suffered for the national cause. The men came in special cars from West Ham and Poplar Hospitals.

Sir Eric Geddes has been appointed by Mr. Lloyd George to the new post of Director-General of Military Railways. He will act as Deputy to the Quartermaster-General in matters affecting transport services and will also direct and organise such services in France under the General Officer Commanding-in-Chief. Sir Eric Campbell Geddes began life as a clerk and shunter on the Baltimore and Ohio Railway, afterwards becoming wagon agent and checker to a lumber company. He next managed a steam tramway in India, superintending the development of an agricultural area and ultimately became manager of an Indian railway. In 1904 he was appointed claims agent to the North-Eastern Railway in this country, rising to the position of commercial agent and chief goods manager. In 1911 he was appointed deputy general manager. When the Ministry of Munitions was formed last year he became Deputy Director-General of Munitions Supply, and on Mr. Lloyd George leaving that department he took Sir Eric Geddes with him to the War Office to make a report generally on transport services.

The Late Sir George Franklin, of Sheffield, besides being on the board of many telephone companies, was a director of the Lanarkshire Tramways Company and the British Thomson-Houston Company.

Captain Hugh McKean, Manchester Regiment, of Norwood Hill House, Surrey, late general manager of the Ceara Tramway Light and Power Company, Foetaleze, Brazil, who was killed in action on July 7, left estate valued at £36,344.

CONTRACTS AND ORDERS.

Ilford Coal Contract.—Under the Price of Coal (Limitation) Act, the coal contractors to Ilford Urban Council have raised the price for Welsh coal by 2s. 6d. per ton.

Derby Corporation have made the following contracts:—R. Wade and Sons, tramway standards; British Thomson-Houston Company, switchgear and extension of switchboard; British Electric Transformer Company, two transformers; British Insulated and Helsby Cables, Ltd., armoured and copper cable.

Newcastle Corporation have received only one tender for the supply of coals. It is from the present holder, who would only contract for six months at 2s. per ton extra, this sum being for the cost of carting. The tender was accepted.

Manchester Tramways Committee have accepted the tender of the Frances Motors, Ltd., for a Ford motor van for the parcels department, and of Williams, Harvey & Co., Ltd., for block tin.

Three Years' Contract for Uniforms.—Blackburn Council have adopted a recommendation by the Tramways Committee to enter into a three years' contract for the supply of uniforms. Councillor Higham, vice-chairman of the committee, stated that there had been great difficulty in obtaining uniforms during the war, and if the conflict ended to-morrow there would be no drop in prices for a considerable period.

Rotherham Council have accepted the offer of the British Westinghouse Company to supply a 5,500 k.w. turbo-alternator at £23,700, and of the British Niclausse, Ltd., for the supply and erection of two water-tube boilers at £13,250. Stores for the tramways and electrical departments will not be contracted for during the ensuing year, but purchases will be made as required.

FINANCIAL REPORTS AND MEETINGS.

Silverton Tramway.—An interim dividend of 1s. per share and bonus of 1s. per share has been announced.

Shanghai Electric Construction Company.—The directors announce an interim dividend of 4 per cent. (8s. per share).

Montreal Light, Heat and Power Company.—An interim dividend is announced on the capital stock at the rate of 8 per cent. per annum, for the quarter ending October 31.

Interborough Rapid Transit Company.—The operating revenue for the year ended June 30 was 35,801,528 dollars, an increase of 2,457,785 dollars on the previous year, and operating expenses were 14,008,165 dollars, an increase of 1,066,851 dollars. The surplus over dividends of 20 per cent. on the capital stock was 1,892,014, a gain of 817,867 dollars over the previous year.

Mexico Electric Tramways, Ltd.—At a meeting of holders of the 5 per cent. debentures, held on October 10 in London, Mr. G. S. Pott was appointed a trustee for the debenture holders in place of the late Mr. C. Rube. It was agreed that the payment of the debenture interest should be postponed until July 1, 1917. Mr. Pott, who presided, said the group of companies interested in Mexico had decided to present a united front and assist each other as far as possible.

Mexico Tramways, Light and Power Group.—Sir Alex. Roger presided at a meeting of the holders of five per cent. first mortgage gold bonds of the Pachuca Light and Power Company, held on October 5, when resolutions were passed for the purpose of giving effect to the policy approved at the joint meeting of holders of the various bond issues of the Mexico Tramways Light and Power group of companies held on July 14 last. The chairman said it was important that all the companies should stand together for mutual protection. The policy laid down was a temporary expedient to bridge over the present conditions in Mexico. Affairs in that country had not improved since July, and it seemed unlikely that any permanent stability would be reached unless some form of intervention and financial control was introduced.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-four of the principal tramway undertakings in the United Kingdom for the week ended September 30 give total receipts of £108,660, or £24,160 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or sixty-six more than for the corresponding week. The receipts this year were at the rate of £80 1s. 9d. per mile of single track, and last year at the rate of £80 13s. 6d., thus showing an increase for the week of £8 8s. 3d. per mile open, which is largely attributable to the munition workers' holiday. With one exception every tramway in the list shared in the increase. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

DIVIDENDS. PREV.	DIVIDENDS. LAST.	NAME.	PAID.	PRICE, JULY 27, 1914	CASH. Oct. 12.	A WEEK AGO.
5%	5%	Alabama Traction. 5% 1st. Mt.	—	67	69⅜	68½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅜	62/6	70/-
4%	4%	Do. 4% Deb. ...	100	91	74	74
4½%	4½%	Do. 4½% Deb. ...	100	98½	77½	77
5%	5%	Do. 5% Deb. ...	100	96	71	74⅜
1/-	7d	Auckland Elec. Trams. Ord. ...	1	1⅝	21/-	21/-
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102¼	93⅜	94
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅛	10⅜	10⅜
4½%	4½%	Do. 4½% Deb....	100	96	83	83
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	91½	91½
$1	$1	Brazilian Trac. & Power Ord. ...	$100	66	56⅜	57⅜
$1½	$1½	Do. 6% Cum. Pref.	$100	97	93⅜	93⅜
4/-	4/-	Brisbane Elec. Trams. Otd. ...	5	7½	7	7
2/6	2/6	Do. 5% Cum. Pref.	5	5	85/-	85/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	58⅝	59
6%	5%	Do. Pref. Ord....	100	106	59	61⅛
5%	5%	Do. 5% Cum. Pref.	100	103	74	73
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	89	89
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	68⅞	68⅞
—	£3	Brit. Elec. Trac. Ord.	100	—	36½	36½
—	6%*	Do. 6% Cum. Part Pref. ...	100	—	79	80½
5%	5%	Do. 5% Deb.	100	92	83xd	83xd
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	70⅜	70⅜
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	81½	81½
3/-	6/6	Calcutta Tramways, Ord. ...	5	7½	6⅝	133/-
1/3	1/3	City of B.A. Trams.	5	5½	90	90/7½
5/-	4/-	Dublin United Trys 6% Pref.	10	12	11	11½
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79⅜	79⅜
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	27/6	27/6
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅜	2/1½	2/1½
6/-	6/6	Lanarkshire Trys. Co.	10	10½	9⅝	9⅝
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9⅜d.	9⅜d.	Llandudno & Colwyn B. Ord. ...	1	—	9/10½	9/10½
—	1⅛d.	Lond. & Sub. Traction Ord. ...	1	1⅝	2/4½	2/4½
6d.	6d.	Do. 5% Pref.	1	1/6	8/3½	7/9
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	62½	62
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	90	89
5%	5%	Do. 5% Inc. Deb.	100	88½	81½	82
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	47⅞	47½
3/-	3/-	Madras Elec. 6% Pref. ...	5	5⅛	96/6xd	96/6xd
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	66⅜	66⅜
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	68	67½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	78	78
$1½	$1½	Mexico Trams. Common ...	$100	70	32½	31½
5%	5%	Do. 1 Mt. 5% G.B.	—	8¼	4⅜	4⅜
6%	6%	Do. 6% Mt. Bds.	100	76	34	35½
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	94½	94½
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95½	95½
1/2*	1/2⅝*	National Steam Car	1	⅝	19/1½	19/3
9⅜d.*	9⅜d.*	New General Traction	1	⅜	7/9⅜	7/9⅜
6d.	8⅜d.	Northern Gen. Trans. Ord. ...	1	⅝	15/4½xd	15/4½xd
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	70/-	70/-
5%	5%	Do. 5% 1st Deb.	100	89½	74½	74½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80⅜	80⅜
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	½	11/-	11/-
10d.	8d.	Provincial Trams. Ord.	1	⅜	17/-	17/-
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84xd	84½xd
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	92½	92
5%	5%	1st. Mt. 5% 50 yr.	100	89½	77xd	78xd
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	91½	92½
5%	5%	Do. 5% Perp. Deb.	100	99½	81½	81½
—	—	Singapore Elec. Trams	5/-	½	4/10½	4/10½
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	96½	96½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	82½	82½
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	95	95
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	77xd	77xd
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	9/3	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	90/-	90/-
—	—	Metropolitan Dist. Ord. ...	100	21½	17	17
—	—	Undgd. Elec. Rys. of London ...	10	2⅜	37/-	36/3
		Do. "A"	1/-	⅜	5/9	5/6
4½	4½	Do. 4½% Bds of 1933 Rd.	—	99	101	100½
6	6	Do. 6% 1st Cum. In. Db.	100	114	106½	106½
6	6	Do. 6% In. Bonds Rd. ...	—	88	89½	88⅜

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1915	1916	Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	Oct. 7	£53,082	£54,067	41	£2,031,900	— £2,007
Auckland.....(28 days)	Aug. 25	19,876	20,469	8	41,974	— 55
Ballarat and Bendigo ...	Aug. 13	2,860	2,791	20	15,870	+ 836
Brazilian Traction Mlrs.	Aug.	6,576,000	7,184,000	35	54,329,000	+3,365,890
Brisbane	Sept.	30,360	32,530	39	297,660	+ 22,586
British Columbia.....$	Aug.	507,126	550,293	9	1,088,586	+ 70,737
Buenos Aires Lacroze ...	Sept. 3	39,355	37,075	13	111,945	+ 10,338
Burmah Tramway ... Rs.	Sept.	22,163	23,749	9	48,161	— 839
Calcutta.....Rs.	Oct. 7	71,039	76,405	41	2,728,377	+ 135,948
Cape Town	Aug.	...	13,394	...	...	...
Carthagena & Herrerias..	Sept.	1,252	1,779	39	22,600	+ 7,020
Cordoba	Aug.	14,159	13,852	22	71,165	+ 469
East India	Sept.	2,054	2,523	9	5,045	+ 725
Hong Kong .....$	Sept. 2	11,656	17,048	38	508,853	+ 125,754
Kalgoorlie	July	2,775	2,521	31	17,458	— 1,496
La Plata	Sept.	3,894	3,994	39	37,622	— 257
Lima	Aug.	32,004	33,395	35	270,710	+ 12,959
Lisbon .....Escu.	Aug.	...	203,703	...	...	...
Madras .....(2 weeks)	Sept. 30	28,304	31,788	39	569,786	+ 41,725
Manila	July	23,750	33,700	31	887,739	+ 39,986
Manaos .....Rs.	July	...	152,380	...	...	...
Melbourne	May	...	69,275	...	...	...
Montevideo	Sept.	25,070	26,711	48	319,043	+ 15,626
Pernambuco	Oct. 1	2,945	3,094	39½	47,568	— 2,634
Peruvian .....$	Sept.	755,280	911,910	13	2,643,240	+ 344,083
Port Elizabeth	Aug.	...	2,863	...	...	...
Rangoon	Sept.	4,445	4,137	39	41,328	— 2,001
Shanghai .....$	Oct. 6	27,675	31,134	...	...	...
Singapore .....$	Sept. 2	11,990	12,596	35	438,093	+ 45,893
Toronto.....$	Aug.	762,627	889,241	35	7,092,229	+ 746,526
Winnipeg	Aug.	251,189	249,795	35	2,193,957	— 57,510

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	1916	Incr. or Dec.	Wks.	Aggregate. 1916	Incr. or Dec.
Aberdare U.D.C.	Oct. 3	£377	£443	+ 66	27	£10,644	+ £1,217
Aberdeen Corporation...	,, 4	1,729	1,912	+ 183	18½	35,869	+ 1,919
Accrington Corp.	Sept. 27	584	670	+ 86	26	15,524	+ 557
Ayr Corporation	Oct. 7	284	331	+ 47	21	11,043	+ 936
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	,, 8	1,355	1,596	+ 241	27½	42,577	+ 4,036
Birmingham Corp.	,, 7	15,403	17,079	+ 1,676	27	451,367	+ 67,652
Do. Motor Omnibuses	,, 7	880	961	+ 81	27	27,298	+ 3,360
Blackburn Corp.	,, 4	1,135	1,221	+ 86	27⅝	36,327	— 1,021
Blackpool & Fleetwood.	,, 7	665	845	+ 180	40	39,759	+ 4,710
Blackpool Corp.	*	...	...	...	...	...	...
Bolton Corporation	,, 8	2,693	2,911	+ 218	24	81,400	+ 5,648
Bournemouth Corp.	,, 11	1,995	2,223	+ 228	28	69,093	+ 4,781
Bradford Corporation ...	Sept. 30	6,393	7,077	+ 684	26	184,572	+ 6,300
Brighton Corporation ...	Oct. 8	1,099	1,228	+ 129	27½	37,630	+ 3,724
Bristol	,, 6	9,096	10,570	+ 1,474	40	404,788	+ 19,893
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation	,, 7	1,564	1,797	+ 233	28	48,750	+ 2,732
Burton-on-Trent Corp...	,, 8	316	321	+ 5	27	7,631	— 580
Bury Corporation	,, 8	1,332	1,408	+ 76	28½	40,956	+ 1,889
Cardiff Corporation	Sept. 30	2,717	3,151	+ 434	26	80,293	+ 6,685
Chatham & District	Oct. 5	1,221	1,353	+ 132	40	49,538	+ 2,196
Chesterfield Corp.	Sept. 23	276	274	— 2	25	7,201	+ 245
Colne Corporation	,, 30	246	278	+ 32	...	...	...
Cork Electric	Oct.. 5	542	540	— 2	40	20,525	+ 194
Croydon Corporation ...	*	...	...	...	...	...	...
Derby Corporation	,, 10	1,017	1,190	+ 173	24½	31,699	+ 2,114
Dover Corporation	*	...	...	...	...	...	...
Dublin & Lucan	,, 6	150	165	+ 15	14	2,629	+ 217
Dublin United	,, 6	6,077	7,058	+ 981	40	243,237	— 1,994
Dundee City	,, 4	1,449	1,438	— 11	20⅔	29,071	+ 757
East Ham Corporation	,, 7	1,232	1,302	+ 70	27½	36,542	+ 165
Exeter Corporation	,, 6	362	430	+ 68	27	11,325	+ 353
Glasgow Corporation	,, 7	22,359	24,295	+ 1,936	18⅔	433,428	+ 30,948
Glasgow Subway	,, 7	1,107	1,165	+ 58	40	45,563	+ 3,900
Glossop (U. Elec. Supp.)	,, 7	136	146	+ 10	41	5,708	+ 568
Halifax Corporation	,, 3	2,106	2,223	+ 117	26⅔	63,166	+ 1,012
Do. Motor Omnibuses	,, 3	48	52	+ 4	26⅔	1,358	— 56
Hastings & District	,, 6	984	1,076	+ 92	40	43,391	+ 2,807
Huddersfield Corp.	,, 7	2,557	2,791	+ 234	27	81,954	+ 6,927
Hull Corporation	,, 7	3,064	3,025	— 39	27	85,235	+ 1,180
Ilford U.D.C.	,, 7	620	669	+ 49	27	19,219	+ 980
Ilkeston Corporation ...	*	...	...	...	...	...	...
Ipswich Corporation	,, 7	523	474	— 49	27	15,138	— 727
Isle of Thanet ...	,, 7	340	338	— 2	1⅔	338	— 117
Kilmarnock Corp.	,, 7	164	180	+ 16	20⅔	3,726	+ 42
Lanarkshire	,, 5	2,101	2,485	+ 384	40	92,763	+ 13,910
Lancashire United	,, 4	1,705	2,349	+ 644	40	73,607	+ 3,525
Leeds City	,, 7	8,821	9,902	+ 1,081	28	272,877	+ 24,209
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	,, 7	765	886	+ 121	20⅔	18,784	+ 2,258
Leyton U.D.C.	Sept. 28	1,606	1,889	+ 283	26	45,217	+ 900
Liverpool Corporation...	Oct. 7	13,544	14,619	+ 1,075	40⅓	566,362	+ 28,622
Llandudno & Colwyn B.	,, 6	302	327	+ 25	44½	16,902	+ 1,015
London County Council	*	...	...	...	...	...	...
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation...	*	...	...	...	...	...	...
Maidstone Corporation..	,, 5	253	260	+ 7	27	6,187	— 168
Manchester Corp.	,, 7	18,289	19,169	+ 880	27	520,341	+ 28,226
Met. Elec. Trys.	*	...	...	...	...	...	...
National Steam Car	*	...	...	...	...	...	...
Nelson Corporation	,, 7	200	201	+ 1	27½	6,002	+ 462
N'castle-on-Tyne Corp.	,, 7	6,509	7,123	+ 614	27	182,298	+ 6,203
Newport (Mon.) Corp.	,, 7	814	1,064	+ 250	27	26,343	+ 2,697
New St. Helens & Dist.	,, 4	961	1,170	+ 209	14	16,635	+ 518
Northampton Corp.	,, 6	676	732	+ 56	27	19,519	— 1,328
Nottingham Corp.	,, 5	3,725	4,064	+ 339	27	107,449	+ 4,046
Oldham Corporation ...	,, 8	2,373	2,303	— 70	28	71,634	+ 4,196
Portsmouth Corp.	,, 7	2,398	2,746	+ 348	...	...	...
Preston Corporation	,, 4	962	1,163	+ 201	26⅔	29,968	+ 3,453
Provincial	,, 7	2,244	2,281	+ 37	1	2,281	+ 37
Reading Corporation	,, 5	767	930	+ 163	26⅔	23,527	+ 1,533
Rhondda Tramways	,, 5	1,241	1,418	+ 177	40	51,415	+ 4,417
Rochdale Corporation...	,, 7	1,714	1,809	+ 95	27½	50,757	+ 2,016
Rotherham Corp.	,, 11	1,191	1,652	+ 461	27⅝	43,340	+ 10,856
Salford Corporation	,, 9	5,302	5,488	+ 186	26⅓	154,031	+ 8,078
Sheffield Corporation...	,, 8	9,195	10,471	+ 1,276	28½	297,614	+ 46,843
Southampton Corp.	,, 4	1,556	1,820	+ 264	26⅔	45,805	+ 3,895
Southend-on-Sea Corp...	,, 4	723	929	+ 206	27	28,613	+ 3,228
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	,, 7	821	861	+ 40	27½	23,360	+ 1,020
Sunderland Corp.	,, 8	1,479	1,655	+ 176	27	45,554	+ 3,311
Sunderland District...	,, 4	564	656	+ 92	48	30,110	+ 2,183
Swindon Corporation ...	,, 4	198	222	+ 24	26⅔	5,642	+ 129
Torquay Tramways.	,, 5	539	624	+ 85	40	24,393	+ 1,871
Tyneside Trys. & Tmrds.	Sept. 27	619	689	+ 70	13	9,337	+ 685
Wallasey Corporation ...	Oct. 7	1,213	1,299	+ 86	27½	39,746	+ 2,255
Walsall Corporation	,, 7	802	841	+ 39	41	33,114	+ 3,163
Walthamstow U.D.C.	,, 7	820	1,071	+ 251	27	31,464	+ 4,967
Warrington Corp.	Sept. 28	466	535	+ 69	26	12,887	+ 1,014
West Ham Corporation	Oct. 5	3,034	3,395	+ 361	26⅔	89,031	+ 3,291
Wigan Corporation ...	,, 5	1,553	1,768	+ 214	27	45,754	+ 3,895
Yorkshire (W. Riding)...	,, 8	1,540	1,834	+ 294	41	72,350	+ 7,058

* Issue of Traffic Returns suspended during the War.

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RAILWAY ELECTRIFICATION.

Tramway & Railway World Descriptions.

(ONE SHILLING EACH, postage prepaid).

ELECTRIFICATION OF THE CHICAGO, MILWAUKEE AND ST. PAUL RAILWAY.

(*Issue of September* 14, 1916.)

This is an account of a high-tension direct-current installation of unprecedented magnitude. The railway extends westward across the American prairies, then over the Rocky Mountains and on to the Pacific Coast. The section now electrified stretches for a distance of 440 miles over three successive mountain ranges, and its construction includes some notable features. The article presents a general description of the arrangements for power supply, the overhead construction, and the electric passenger and goods locomotives. Characteristic curves of both types of locomotives are given. Maps, numerous photographic illustrations and drawings serve to convey a realistic idea of the magnitude of the work.

LANCASHIRE & YORKSHIRE ELECTRIFICATION.

MANCHESTER-BURY SECTION—DIRECT CURRENT SYSTEM AT 1,200 VOLTS.

(*January* 13, 1916.)

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Highways and Permanent Way Engineer, City of Leeds.

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THE

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All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

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WEEKLY LIST OF TENDERS INVITED.

CITY OF BRADFORD.

TRAMWAYS DEPARTMENT.

TENDER FOR GENERAL STORES.

Tenders are invited for the supply and delivery of the various articles (for which tenders may be accepted) for delivery as and when required during twelve months ending December 31, 1917, or, alternatively, for the supply and delivery of the whole of the material scheduled (for which tenders may be accepted) during the month of January, 1917, for delivery as required during twelve months or during January, 1917 :—

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1. Bolts, nuts, screws, washers, nails, cotter pins, rivets, brass rod, lead, hack saw blades, and miscellaneous ironmongery.
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1. Steam and gas pipes and fittings.
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10. Oil and grease.
11. Ferric oxide in oil.
14. Paint brushes.
15. Waste, sponges, washleathers, and soap.
17. Glass.

Schedule and conditions of tender may be had on application at the Tramway Offices, 7, Hall Ings, Bradford, on payment of the sum of one guinea (£1 1s.), which amount will be refunded on receipt of a bona-fide tender. (Cheques to be made payable to the order of the Bradford Corporation.)

The contracts will be let subject to the Fair Contracts Clauses of the Corporation.

Samples can be inspected at the Tramway Offices, 7, Hall Ings, Bradford.

Tenders, endorsed "Tender for Stores," to be sent to me not later than Saturday, November 11. The lowest or any tender will not necessarily be accepted.

FREDERICK STEVENS,
Town Clerk.

Town Hall, Bradford,
October 10, 1916.

WALSALL CORPORATION TRAMWAYS.

STORES.

The Corporation of Walsall invite tenders for the supply of the undermentioned stores to the Tramways Department for the year 1917 :—

Motor Grease.	Castings.
Lubricating Oils.	Trolley Wheels.
Cleaning Material.	Cement, etc., etc.

Forms of tender and further information may be obtained at the Tramway Manager's Office, St. Paul's Buildings, The Bridge, Walsall.

Tenders sealed and endorsed "Tender for Stores" are to be sent to the Town Clerk, Council House, Walsall, on or before Saturday, November 4.

Samples (which will not be paid for by the Corporation) are to be sent to St. Paul's Buildings, The Bridge, Walsall.

The Corporation do not bind themselves to accept the lowest or any tender, and they will not accept the tender of any firm or person paying to their workmen less than the standard rate of wages.

R. L. HORSFIELD,
General Manager.

St. Paul's Buildings,
The Bridge, Walsall.
October 18, 1916.

WALSALL CORPORATION TRAMWAYS.

UNIFORMS.

The Corporation of Walsall invite tenders for the supply of Tramway Uniforms for inspectors, drivers, conductors (male and female), etc., for the year 1917.

Particulars and form of tender may be obtained from the Tramway Manager's Office, St. Paul's Buildings, The Bridge, Walsall, where standard samples may be seen.

Tenders endorsed "Tender for Uniforms," are to be sent to the Town Clerk, Council House, Walsall, on or before Saturday, November 4. Samples of cloth are to be sent to St. Paul's Buildings.

The Corporation do not bind themselves to accept the lowest or any tender, and they will not accept the tender of any firm paying their workmen less than the standard rate of wages current in the district where the clothing is to be made.

R. L. HORSFIELD,
General Manager.

St. Paul's Buildings,
The Bridge, Walsall.
October 18, 1916.

MATLOCK COUNCIL TRAMWAY.

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Tenders invited for the supply of Steel Wire Tramway Cable, length 1967 (one thousand nine hundred and sixty-seven) yards, circumference 3/1-8th inches with Manilla Core, delivered at Tramway Depot, Matlock, carriage paid.

Particulars, specification, and terms as to payment, to be obtained from Mr. J. D. Evans, Tramway Manager, Town Hall, Matlock.

Tenders (accompanied by samples of wire), marked "Cable," to be sent to undersigned not later than Saturday, November 4, 1916.

Council do not bind themselves to accept the lowest or any tender.

R. TAYLOR,
Clerk to Council.

Town Hall, Matlock.
October 13.

COUNTY BOROUGH OF WIGAN.

SUPPLY OF GRANITE SETTS.

The Corporation of Wigan invite tenders for the supply of 300 tons of granite setts to the Tramways Committee. Particulars and form of tender may be obtained from Mr. A. T. Gooseman, Borough Engineer, Wigan. Tenders, endorsed "Granite Setts," to be sent to me not later than Wednesday, November 1 next. The Corporation do not bind themselves to accept the lowest or any tender.

WILLIAM HENRY TYRER,
Town Clerk.

Wigan.
October 18, 1916.

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COUNTY BOROUGH OF SOUTHEND-ON-SEA.

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Wanted, a Switchboard Attendant. Applicants must have had a good electrical training and experience in running L.T. and 3-wire D.C., and H.T. 3-phase rotary converters. Wages £2 per week of 48 hours. Person engaged will be on war service. Applications, stating age, qualifications, and when able to take up duties, together with copies of not more than three recent testimonials, to be sent immediately to the Chief Engineer, Electricity Works, Lombard Road, Battersea, S.W.

ATHERTON URBAN DISTRICT COUNCIL.

APPOINTMENT OF RESIDENT ELECTRICAL ENGINEER.

The above Council invite applications for the position of Resident Electrical Engineer. Salary £200. Candidates must be experienced in the distribution of high tension 2-phase alternating current systems.

Applications, endorsed "Resident Electrical Engineer," and accompanied by copies of three testimonials of recent date, stating age, qualifications and experience, must be sent so as to be in the hands of the undersigned not later than October 31st instant.

Canvassing of the Councillors is prohibited.

WILLIAM GARNETT,
Clerk.

Town Hall, Atherton.
October 18, 1916.

HORSHAM URBAN DISTRICT COUNCIL.

RESIDENT ELECTRICAL ENGINEER.

The above-named Council invite applications for the appointment of Electrical Engineer to take charge of their Electricity Works. Applicants must have had experience in the management and working of a central station on the low tension, direct current, three-wire system, and be capable of carrying out extensions of mains and plant; knowledge of refuse destructor work an advantage. Commencing salary, £220 per annum. Required last week in December next. Applicants must be outside military qualifications and not engaged on Government work.

Applications, stating age and experience, with copies of not more than three recent testimonials, to be sent to the undersigned not later than Tuesday, October 31st instant.

S. MITCHELL,
Clerk to the Council.

Council Offices, Horsham.
October 17, 1916.

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BY

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City Treasurer of Bradford, and
WILLIAM WHITTINGHAM,
City Treasurer's Office, Bradford.

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SATURDAY, OCTOBER 21, 1916.

EXTERIOR LIGHTS OF TRAMCARS.

In the Metropolitan area tramway authorities have at last been obliged to accede to the Order made under the Defence of the Realm Act requiring all vehicles to display two front lamps, one on each side, and a rear red light on the off side. When the regulation was first promulgated on the advent of the air raids, the tramway organisations managed to secure the exception of tramcars from its scope. Whether the new rule is now to apply to the whole country is not at present clear, but it is noteworthy that from October 22 the provisions of the lighting Order, which a year ago were imposed on the Eastern counties and certain Midland towns, are to come into force for the whole country. These provisions relate mainly to the method of illuminating motor cars, but one requirement is that all vehicles except bicycles, push tricycles, and handcarts will be forced to show, on and after January 1 next, two front lights, one on each side, and a rear red light on the right side. Each previous extension of the area covered by the Order has been made on the advice of the military authorities, and it is to be presumed that Lord French is responsible for the present inclusion of the whole country and the rigid application of the provisions to tramcars in the Metropolitan area. As regards the latter aspect, it is difficult to believe that the improved air service has made a new survey of London at night and discovered danger in the large but well-shrouded headlight of the tramcar, only the forward one of which is now kept alight. Ground for such a belief as regards the whole lighting of London is afforded, however, by the further restriction of street lighting that has just been carried out. It is a coincidence also that the enemy himself has now adopted in Antwerp and Brussels the scheme of total darkness that has proved so effective a defence in the provinces. In connection with the Allied air raids on the Belgian capital, the Germans have ordered that when the machines are sighted traffic in the streets, including the tramcars, must stop, and that if it be night-time all lights must be extinguished. In conveying their edict to the tramway authorities in the Metropolis, the Home Office have made no statement as to the reasons for forcing the owners to go to the expense of placing two partly-shaded incandescent lamps at each end of a car, following the considerable outlay that was involved in fitting the vehicles for the reduced interior lighting, which in the case of the London County Council exceeded the sum of £3,000. Omnibus owners, too, are called upon to place their rear red light on the off side in lieu of the present position over the entrance on the near side. As was pointed out by the Municipal Tramways Association to the Home Secretary in December last, this change of position may be productive of danger. The council of the Association did not specify the nature of the risk, though it is easy to understand that in the still darker streets drivers of other vehicles may be confused by the alteration, with the result that passengers entering or leaving cars will be placed in danger. Except for the sake of securing uniformity of exterior lighting on all vehicles, it is difficult to grasp the need for the latest interference with tramcars. With their route numbers, destination indicator, the port hole light under the canopy and the headlight, the cars already have four lights in front, while at the rear there are three. On some of the cars fitted with flank lights the motormen are still using the head-light. It would have been an easy matter to render the latter less prominent by introducing an extra paper screen, thus avoiding the danger to the public that the present change is likely to entail.

RAID WARNINGS AND CAR SERVICES.

With the concurrence of the Field-Marshal Commanding-in-Chief the Home Forces, the following regulations have been promulgated for observance by all persons operating tramway services in the Metropolis during the period of threatened air raids. The police have been instructed to enforce the proper observance of the regulations.

(1) The several authorities to be warned by telephone to take air raid precautions.
(2) Immediately on receipt of this order the several authorities are to at once communicate in an approved manner the indication to the car drivers throughout their area.
(3) The speed of all cars must be instantly reduced (by running on series only), so that the speed in no case is in excess of six miles per hour.
(4) That only one lighting circuit be used, no additional circuit being put on until the warning is withdrawn.
(5) That the trolleys be connected with and disconnected from the trolley wire in such a manner that flashing is avoided.
(6) That the drivers "throw off" at all section insulators and when passing special work, frogs, cars, etc., where flashing would be likely to occur.
(7) That tramway managers take special precautions to ensure that no defective trolley wheels are used.

The public carriage inspecting staff will co-operate with the police to enforce these regulations, members of that staff taking up the positions allotted to them as soon as the warning is received. Should the police observe any infringement of the regulations they are to stop and warn the driver of the risk occasioned by his neglect and they will also prepare a report for the information of the Commissioner of Police.

APPLICATIONS TO TRIBUNALS.

Exemption of fifteen men from military service was asked for at Broadstairs Tribunal by Mr. J. A. Forde, general manager of the Isle of Thanet Tramways and Lighting Company, who stated that since July, 1914, the staff had fallen from 270 men to 110 men, women, and boys. There were now 55 motormen to run fifteen cars. The drivers thus relieved were put into other departments. Three men were allotted to every two cars. Many of the men were doing a day and a half's work each day, seven days a week. Even now he was behind with some of the necessary work. Replying to a question, Mr. Forde said it was utterly impossible to employ women as drivers, although they were utilised in other places where the equipment was different. The Tribunal gave conditional exemption to four motormen, two were refused, and one granted three months' exemption. Two inspectors (who also act as motormen) secured conditional exemption. A storekeeper was given six months. This man had been thrice rejected, but had now passed for service. Three sub-station men were given three months each, and one received conditional exemption. A steam-engine driver was given conditional exemption.

According to a statement made by Mr. J. B. Hamilton, the Leeds Tribunal have decided, notwithstanding his earnest protest, to take several men who were absolutely essential for car repair and

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maintenance. The decision was arrived at despite the need for an adequate service of cars for the workers of the city. Over two million passengers were being carried a week, the vast majority using the cars for business purposes. That the service was regarded as important for munitions was indicated by the tramways having been made a certified occupation. If the attitude of the tribunal was persisted in the service would have to be greatly curtailed. The Tramways Committee had allowed about a thousand men to leave the department, and three recent accidents were attributable to some extent to inexperienced drivers.

A suggestion was made at the Ilford Tribunal that women should be employed as drivers of the Urban Council's tramcars. The management referred to the proposal as foolhardy and as contrary to the Metropolitan licensing authority's regulations.

The Maidstone Tribunal refused to allow temporary exemption for the chief clerk of the tramways undertaking while a woman was being trained to fill the position.

Two months' exemption, with leave to appeal, was granted to a motorman employed on the Barking Council Tramways.

A Glasgow tramway employee's appeal as a conscientious objector was dismissed. He could not define the grounds of his objection, but said "he was in the world though not of the world."

TRAFFIC DURING RESTRICTED LIGHTING.

To assist in the restriction of lighting, and to economise coal, the Government propose making an Order for the closing of shops throughout Great Britain during the winter at 7 p.m., and on Saturday at 9 p.m., the weekly half-holiday being retained. There will be certain exceptions from the Order, which will come into force on October 30.

On October 30 the last cars from the centre of Sheffield will start at 10.40 p.m. instead of 11.10. Alderman Knowles, in making this announcement to the Council, said the department proposed to continue the alteration until the end of the war. The number of accidents in the darkened streets was increasing and under the circumstances the committee thought it advisable to curtail the service. It has since been stated that if the church services are held at an earlier hour on Sundays, the last cars on that evening will be at 9.30 in order to afford a relief to the hard-worked employees.

In reply to complaints that passengers have to incur risks to read the destination signs on the Salford cars, the chairman of the Tramways Committee informed the council that the matter was in the hands of the Manchester police. He undertook to see if the cause of the complaint could be remedied.

Darlington tramway service has been curtailed owing to the restricted lighting of the streets and the shortage of car hands.

Lowestoft Council have rejected a motion to stop the car service at 7 p.m., the chairman of the committee stating that it would entail a loss of over £10 per week at a period when the receipts were on the up grade as compared to last year.

To assist passengers to find their cars at Liverpool a large poster is placed on the window on each side, bearing the names of the destination on single routes. Certain difficulties prevent the adoption of the plan in cases where cars travel outwards by one route and return by another.

L.C.C. TRAMWAY MATTERS.

The London County Council resumed their fortnightly meetings after the summer recess on Tuesday last, when a number of reports were submitted by the Highways Committee in reference to tramway matters.

CERTIFICATION OF THE TRAMWAYS UNDERTAKING.

The Highways Committee reported that on September 6 the Minister of Munitions issued a certificate that the supply of tramway facilities by the Council's tramways department was of importance for the purpose of carrying on munition work. The undertaking thus becomes subject to the provisions of Part I. of the Munitions of War Act, 1915, which prohibits strikes and lock outs, and the provisions as to leaving certificates will now apply to employees in the tramway department. Under section 4 of the Act, the Minister of Munitions may declare certified undertakings to be controlled establishments, but, as at present advised, he does not propose to take this course in the case of the Council's tramways.

Mr. G. H. Hume (chairman of the Highways Committee) said the certification of the undertaking was not due to the internal conditions of the tramways. On the contrary, he desired to pay a tribute to the loyalty of the staff at this time of pressure.

FALCON ROAD TO LAVENDER HILL JUNCTION LINE.

The Council approved on March 10, 1914, a capital estimate of £3,866 for the installation of a junction line leading from Falcon Road to Lavender Hill, Battersea. The work was carried out early in 1915, but the actual expenditure amounted to £4,570, or £704 in excess of the estimate that was framed in 1913. The Council approved of the additional expenditure.

ALTERATION OF CAR LIGHTING.

In order to comply with the Lights (London) Order of August 26, 1916, which provides that the lights of tramcars must not be more than is sufficient to enable fares to be collected it has been necessary to make alterations and additions to the wiring of the cars. The work is estimated to cost £3,020, and a supplemental maintenance vote for this amount was agreed to.

APPLICATIONS FOR INCREASES IN WAGES.

An application has been received from employees in the traffic section for advance of wages of 15 per cent. upon current rates. In accordance with the desire of the men, the application having been refused, it was referred to the traffic conciliation board. Applications had also been received from saw mill machinists for an increase of 1*d.* per hour in their rate of pay (10*d.* to 1*s.* an hour), and from advertisement labourers for increased payment for overtime. These applications were referred to the rolling stock conciliation board.

RESIGNATION OF TRAFFIC ASSISTANT.

The Highways Committee reported that Mr. M. L. Slattery had submitted his resignation, having been appointed general manager of West Ham Corporation Tramways. It was agreed that the resignation be accepted as from October 31, 1916.

CAR AXLE OIL.

During the recess tenders were invited for the supply of car axle oil for the tramways department. As the oil was urgently required, it was necessary, although the estimated value exceeded £500, for the tenders to be dealt with during the recess, and they were opened by the deputy chairman of the Council. The Highways Committee reported that particulars of the contract entered into would be included in their next periodical report.

TRAFFIC RETURN.

The traffic statement showed that the receipts during the eleven weeks ended October 4, 1916, amounted to £554,271, an increase of £36,808 as compared with the corresponding weeks in 1915. The passengers numbered 130,814,286, an increase of 9,855,782. The total traffic receipts from the beginning of the financial year from April 1, 1916, to October 4 aggregated £1,300,893, an increase of £134,937 over the corresponding period.

TRAMWAY TRAFFIC AND AIR RAIDS.

In reply to a question, Mr. G. H. Hume (chairman of the Highways Committee) stated that in operating the tramways, at times of threatened or actual air raids, the Council acted in close contact with and under direction of the military and police authorities.

STANDING PASSENGERS ON TRAILERS.

Replying to Mr. J. D. Gilbert, Mr. G. H. Hume said the question of providing a handrail for the convenience of standing passengers in trailer cars had been settled with the Commissioner of Police, and a supply of such rails was now on order. As to calling out car destinations at principal stopping points, the suggestion would receive attention.

The chairman, in the course of his annual review, referred to the tramway services, which had been remodelled. The best energies of the Committee and staff had been devoted to the task of providing sufficient and efficient means of transit for the thousands of munition workers the war had called into being. Unfortunately, that work had been attended with greater difficulty than need have been the case. The difficulties were materially increased by the strike of May, 1915, now happily past history, but it must be mentioned, if only for the fact that it emphasised the importance of the task which had fallen to and been efficiently performed by the tramways undertaking. Owing to the war much work for the development and linking up of the tramways would have to wait still longer for its accomplishment.

THE EMPLOYMENT OF WOMEN.

Leicester Tramways Committee are considering the advisability of training several women as drivers.

The representatives of the Trades Council on the Blackburn Corporation have agreed to hold a meeting to discuss objections to the employment of women as drivers and inspectors on the local tramways. The men's union contend that there is plenty of male labour available for training as motormen, while as to inspectors they maintain that preference should be given to men who have served the undertaking for periods ranging from five to twenty years. It is also complained that the women drivers are given cars that are in the best condition and have vestibule fronts.

Two Oldham inspectors having been called to the army, the general manager has obtained the Tramways Committee's sanction to the appointment of four women to act as ticket inspectors and to supervise the women conductors, of whom there are 106. The salary is 30s. per week, but the women will have no responsibility at present regarding the motormen or the regulation of traffic. Mr. Priestly informed the Tramways Committee that the two latter questions were put to him by the conductors whom he was going to appoint, and he replied that eventually circumstances might necessitate them taking over the full duties. The wage would be the minimum for six days' work, extra pay being given for overtime.

Birmingham Watch Committee have sanctioned a reduction of the age from 21 years to 18 of women eligible for employment as conductors. It is becoming increasingly difficult to find women of the higher age to do the work.

Several women conductors have been trained as drivers at Bath and are working on the Tiverton route.

Women inspectors were employed for the first time on October 1 on the Paris tramways and omnibuses, where they supervise the conductors of that sex. Those of the latter who are war widows wear a white band on one arm. Included in the uniforms of the inspectors is a white lace collar.

On the Prussian railways the staff on passenger trains now chiefly consists of women. Women also form one-third of the goods trains staff. All definitely rejected men of the 1870-75 class have now been mobilised in Germany. Only those invalided from active service during the present year are exempt.

Women are being trained as engine-drivers on the Schleswig-Holstein railways, says Reuter's Copenhagen correspondent, a large number of the male drivers having been called up for military service. Special training schools have been established at Flensburg, Apenrade, Rendsburg, Kiel, and elsewhere, capable of turning out about fifty women drivers monthly.

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PROGRESS OF THE BATTERY VEHICLE.

According to statistics in the current issue of the "Electric Vehicle," published by the Electric Vehicle Committee, there are now in use, or on order, in this country 778 battery propelled vehicles, as compared with 150 in 1914. Among the largest users are the Midland Railway, 76; other railway companies, 39; Harrod's Stores, 64; Hertford Street Motor Company (London), 120; tramway authorities, 22; private cars, 57; municipal authorities, 36; electricity undertakings, 42; munition works, 23. A two-column article deals with a report prepared by Mr. Pearce, Manchester City electrical engineer, of an eight weeks' trial of a 1-ton Edison lorry. Mr. Pearce was sceptical as to the possibility of the electric lorry being able to compete with the existing contract carting arrangements based on a payment of 1s. 6d. per van per hour, and also as to the claims made for the former. The report shows that the cost of running of the lorry comes to about 2s. 1½d. per hour, including depreciation, interest, insurance, and the usual working expenses. Energy consumed worked out at approximately one unit per mile, the cost being ½d. per unit. The electric vehicle is shown to be worth 2½ horse vans. The horse van costs 9d. per mile traversed, with no known allowance for depreciation or renewal, while the lorry cost only 7.65d. per hour, running 188.1 miles a week average and showing a weekly ton mile total of 81.95. This running cost per mile allowed for complete renewals of the battery at the end of ten years. Mr. J. R. Mead, Ipswich borough surveyor, contributes an article on a year's experience of an electric 3-ton tipping wagon supplied by the General Vehicle Company. This machine has proved "very reliable and economical and is so simple to drive that any intelligent labourer can be taught all there is to learn in a few hours." Its handiness in negotiating congested streets and in manœuvring to loading and tipping places is a great advantage Mr. Mead's only criticism is of the slowness of the hand-tipping gear, and he suggests that power-operated gear should be fitted. "The Electric Vehicle" reports that the value of battery vehicles in use in America is £4,158,000, those operated in the United States Government service being valued at £87,000.

Four Omnibus Bodies and Spare Engine Parts for Sale.—Our Advertisement pages contain an announcement that the Southend Tramways Department have four single-deck omnibus bodies to dispose of. There is also for sale a set of new spare parts for the Tilling-Stevens petrol-electric Engine.

MISCELLANEOUS NEWS AND NOTES.

South Shields Tramways have been recognised under the Munitions of War Act as an undertaking of importance in connection with the carrying on of munitions work.

Material for Uniforms.—The material used by a local firm which supplies the uniforms of the Sheffield women car conductors is khaki serge dyed navy blue indigo. The contractor states that there is nothing stronger, which accounts for the uniforms keeping their shape, although a good deal depends upon the way the wearer treats her clothes.

Trolley Wheels for Johannesburg.—The Board of Trade Commercial Intelligence Department announce that tenders will be received by the Town Clerk, Johannesburg, up to noon on November 20 for the supply and delivery of 500 or, alternately, 1,000 trolley wheels for tramcars. Specifications and a blue print may be seen at 73, Basinghall Street, E.C.

The Bentley Difficulty Settled.—A settlement has been reached in the dispute between Doncaster and Bentley Councils as to the position of the crossover which the former authority proposed to construct in front of Bentley Church. Both parties have agreed to the crossover being placed 36 yards away, and the work of reconstructing the line from Doncaster to Bentley has been resumed.

Trade Union View of Car Meters.—The secretary of the Tramway Employees' Union at Blackburn has informed the trades council that every car had a meter on it—a German meter—and the men were subjected to a lot of humbug on account of these meters, which were entirely unreliable. The same speaker "is almost sure that the consumption of current is not taken into consideration in the case of the women drivers as it is in the case of men."

Dublin Employee's Widow's Claim.—The Dublin Recorder has dismissed with costs the claim of the widow of a carter, employed by Dublin United Tramways Company, for compensation from the company for the death of her husband during the rebellion. Deceased left the stables to get milk, against orders, and was shot. There was sufficient food on the premises. The Recorder held that deceased undertook risk which did not arise out of his employment.

London United Track Repairs.—As the result of an interview with the managing director of the London United Tramways Company and a special committee of the Ealing Council, the latter body have decided that the company should not be pressed in regard to reconstruction of track immediately upon the termination of the war. The attitude of the Council will then be dependent upon the condition of the track at that time. Meanwhile the company are to improve the condition of the track in Ealing.

Hull Policy of No Appeals for Car Employees.—Following the arrest of two Hull motormen on a charge of being absentees from military service, the tramway employees met on Sunday last and appointed a deputation to the Tramways Committee with the object of ascertaining the position of the men of military age. The Committee passed a resolution to the effect that they could not recommend any alteration in the policy hitherto proposed, namely, that no appeals be made in respect of any tramways employee. The Bench have since handed the two men over to an escort, but did not impose a fine.

Bombay Tramways Extension.—A committee of the Bombay Corporation have recommended that sanction be given to an application by the Tramways Company to extend their lines along Kingsway. This new thoroughfare has not yet been taken over by the Council, but the Corporation solicitor has advised that the authority have the power to grant the application. Attached to the Committee's recommendation is a proviso that if the Corporation at some period subsequent to the laying of the lines decide to lower the levels of the road the company shall bear the expense of any alteration in the levels of their lines.

New Cars on Temporary Credit.—In consequence of the objection of the Treasury to the granting of loans during the war, Plymouth Tramways Committee have arranged that if they cannot borrow £8,600 for eight new cars at once the makers will allow them credit at 5 per cent. per annum interest until the money can be paid. Councillor S. H. Phillips, chairman of the committee, has stated that the cost of the cars will considerably exceed that of the last new cars, which cost £855 each, the increase being due to the present cost of materials and labour. They hoped to receive the cars by May or June.

Motor Trade Association Council Meeting.—The annual dinner of the Fellowship of Old Time Cyclists, which is to be held at Frascati's on October 25, more or less clashes with a rather important Motor Trade Association Council Meeting and Divisional Committee's gathering at Cardiff on the following day (Thursday, the 26th). It is possible, however, for those who are anxious to be present at both functions to do so, for they may go down to Cardiff from London by a breakfast car train which leaves Paddington at 8.45 a.m. and arrives at Cardiff at 11.30. This would be in good time for the reception by the Lord Mayor, the luncheon at the City Hall, and the M.T.A. Council Meeting which follows.

The Government and the Coal Supplies.—A national conference of the coal trade has been called by the Government for October 25, in the Central Hall, Westminster. On the previous day there will be a joint conference of coalowners and workmen, and on October 23 the executive committee of the Miners' Federation will assemble. At the national conference a member of the Cabinet will expound the needs of the State for the maintenance of the coal output to meet the requirements of our own industries, particularly in the production of munitions, the requirements of our Allies, and the production of surplus coal over and above these requirements for sale in neutral markets to sustain the rate of exchange.

Suggested Linking of London Power Stations.—Poplar Electricity Committee have decided to negotiate with the London County Council in order to link up the borough council's generating station with the power station of the tramways. An increased supply of energy is required to meet the demands made upon the Poplar plant, and the borough council's engineer has advised that an extension of the works would cost £76,500, as against £8,000 for linking up with the county authority's station. The latter plan, he stated, would be advantageous to both undertakings as their peak loads occurred at different hours. A conference of Metropolitan Councils owning electricity undertakings has been arranged for consideration of the question of linking up generating stations in the Greater London area.

Leeds Award on Women's Wages and Bonus.—Mr. E. Forbes Lankester, of the Board of Trade, has issued his award in the arbitration in regard to wages of women conductors on Leeds city tramways and the question of their participation in the war bonuses. The Tramways Committee, holding that the engagement of women was a temporary measure, refused to put them on the men's graduated scale of wages. The women's rate was fixed at 5½d. per hour, the commencing rate for men, and they were not given the war bonus of 2s. (since increased to 3s.) per week. The decision of the arbitrator is against the union on the question of the rate of wages, but all women conductors with three months' service are to receive half the bonus and those with twelve months' service the full bonus, payments to be retrospective from the time of qualification.

A Light to be Carried with Cattle.—Attention was directed in our issue of October 7 to the danger placed in the way of all forms of road traffic through animals being allowed to be driven at night without anything to indicate their presence. On October 18 the Home Secretary issued an order under the Defence of the Realm Act, to come into operation on the 22nd inst, under which a lamp showing a white light to the front and rear must be carried at the rear of the animal, herd or drove. Where there are not more than four animals, which are being led, the light may be carried by the person leading them. If there are more than twenty cattle or more than 100 sheep, lambs, goats, kids, or swine, a second lamp must be provided to be carried in front. The Order applies to England and Wales, but organisations interested have it in their power to move the Secretary for Scotland to similar action.

Employees and their Wages.—Glasgow Tramways Committee have informed the car cleaners that the recent war bonus granted to the traffic employees will be made applicable to them. It is also proposed that the hours of the cleaners should be increased from 51 to 54 per week for the duration of the war, the extra hours to be paid for at overtime rates. Several hundred employees are affected by the recommendation, which will also apply to other grades excluded from the bonus granted to the traffic staff. The chairman and general manager at Dundee have met a deputation of the tramway employees who asked for an increase of 6s. per week. The Tramways Committee have decided to grant an increase of 2s. to all employees earning under 40s. per week, with the exception of the office staff, the employees of the parcels department, and the tradesmen, the wages of the last section being regulated by their unions. A special committee of Leicester Corporation recommend that the war bonus to the married employees be increased to 4s. per week.

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Birmingham Power Station Breakdown.—When the shaft of the defective turbine at Nechells generating station was examined it was found not to be fractured as was at first reported. The electricity department therefore hope to have the plant in full operation about the end of next week. Meanwhile the tramway service has been restricted, and in case another breakdown occurred the conductors were provided with special tickets to be given to passengers to enable them to complete the journey on some other occasion without incurring extra expense. One such stoppage happened for an hour before midday on October 16. On the same day a new generator, weighing about 34 tons, was being conveyed to the works, when it was thrown from the trolley and fell against a house, owing to the roadway falling in. During the week there has been a great rush on the railway service. In a report presented to the City Council on Tuesday last the Electricity Committee stated that the several interruptions of the supply during the past 18 months were due to the severe strain imposed on the plant by the numerous munition establishments. The boilers were designed for a low grade of fuel, but the heavy load thrown upon them could only be met by forcing the boilers and by the employment of a higher grade of fuel. At a meeting of the Corporation on October 17, Councillor Harrison Barrow, chairman of the Tramways Committee, criticised the Electricity Committee for lack of foresight, and said that if the 1913 scheme had been carried out the present difficulties would not have arisen. In three days alone the tramways had lost nearly £2,000. In reply Alderman Jephcott, chairman of the Electricity Committee, said it was impossible to conserve power for certain parts of the day, as there were no storage batteries.

PERSONAL.

Mr. Louis Slattery will enter upon his new duties as general manager of West Ham Corporation Tramways on November 1.

Chief Inspector A. W. Baker, Doncaster Corporation Tramways, has been appointed traffic superintendent, filling the vacancy caused by the resignation of Mr. A. M. Strachan.

Mr. Harry Lotery, of Messrs. H. Lotery and Company, Ltd., uniform clothing contractors, of 4 to 8, St. Mary Street, London, N.E., has been elected a member of the Stepney Borough Council.

Alderman J. H. Hargreaves, who was asked to serve for a fourth year as Lord Mayor of Hull, has had to decline the honour owing to ill-health. For a number of years until the present year the alderman was chairman of the Tramways Committee.

Mr. Conway, who has held important positions in various light and power companies, has proceeded to Mexico at the request of the committee who are acting in the interest of the Mexico Tramways' Light and Power group of companies, owing to the unsettled condition of that country.

Mr. A. C. Cramb, borough electrical engineer, Croydon, has received a communication from the chairman of the Metropolitan Munitions Committee expressing appreciation of the thoroughness with which the committee's work has been carried out in the district of which he has been the honorary manager.

We regret to announce the death of Mr. W. Gordon Davies, traffic manager of the Chatham and District Light Railways Company.

CONTRACTS AND ORDERS.

The Motor Rail and Tramcar Company Ltd., recently supplied a number of petrol tractors and parts to the War Department.

Ford Motor Company (England), Ltd., have a contract to supply motor delivery vans to the War Department.

Barking Council have adopted the following tenders: Siemens Bros.' Dynamo Works, cable; Babcock and Wilcox, Ltd., chain-grate stoker, superheater, etc.; General Electric Co., switchgear.

Sheffield Corporation have placed the following contracts for the supply of spare apparatus for the auxiliary plant at Neepsend station: Siemens Bros.' Dynamo Works, motors and transformer; Dick, Kerr and Co., British Westinghouse Co., and Fuller Electrical Co., motors; Igranic Electric Co., motor starters.

Manchester Corporation have placed the following contracts: Grange Iron Co., Ltd., ash hopper; Etchells, Congdon and Muir, Ltd., hoist gear, etc.; Arton and Co., Ltd., steam and feed pipes and supports, including alterations to existing pipework to two boilers; Avonside Engine Co., Ltd., Bristol, saddle-tank steam locomotive; R. White and Son, Widnes, second-hand railway material; F. W. Brackett and Co., Ltd., water screen; F. Mitchell and Son, Ltd., foundations for wagon lift and turntable; British Thomson-Houston Co., Ltd., switchgear and switchboard; Mather and Platt, Ltd., electrically-driven circulating water-pump; Ferranti, Ltd., extension switchgear, etc.; Stewarts and Lloyds, high-pressure pipework; cables: Callender's Cable and Construction Co., Ltd., British Insulated and Helsby Cables, Ltd., Pirelli General Cable Works, Ltd., C. Macintosh and Co., Ltd., Johnson and Phillips, Ltd.

FINANCIAL REPORTS AND MEETINGS.

Sao Paulo Tramway, Light and Power.—The directors have declared a dividend of 2½ per cent. on common stock.

Rio de Janeiro Tramway, Light and Power Company.—A dividend is announced of 1¼ per cent. on the capital stock.

Calcutta Tramways Company.—An interim dividend on the ordinary shares of 3 per cent is announced.

Callender's Cable and Construction Company.—The board have declared an interim dividend on the ordinary shares of 5s. per share (10 per cent. per annum).

Brisbane Electric Tramways and Investment Company. A dividend has been declared at the rate of 8 per cent. per annum (4s. per share), free of tax, on the ordinary shares for the past half-year.

Half-yearly Results at Bradford.—The general manager on October 16 presented the appended comparative half-yearly return to the Tramways Committee:—

	1916.	1915.	Increase.
Traffic receipts (incl. parcels)	£184,572	£175,962	£8,610
Car mileage	3,160,153	3,143,156	16,997
Receipts per car mile ..	14.01*d.*	13.43*d.*	.58*d.*
Units consumed	6,228,912	6,097,351	131,561
Units per car mile	1.971	1.939	.032
Passengers carried	40,148,066	37,975,411	2,172,655
Wages on revenue account, including permanent way ..	£75,332	£69,346	£5,986

Belfast Tramways Half-yearly Report.—For the six months ended Sept. 30, the working of the Corporation Tramways undertaking shows a surplus profit of £3,883, as against £8,380 for the similar period of 1915. The revenue was £151,080, as compared with £141,580, an increase of £10,400. There was no appreciable increase in car mileage. The receipts per car mile were 11.58*d.*, as against 11.01*d.* for the corresponding period of 1915. The average receipts per car mile for September was the highest yet reached—viz., 11.93*d.*, while the working expenses were also a record—7.03*d.* The increase in the revenue is balanced by a rise of £11,000 in the expenditure, the aggregate being £89,723, as against £78,189 for the same period in 1915. The increased expenditure is due to higher payments for wages, war allowances, sinking fund, income tax, track and car maintenance and electrical energy, the latter total being £20,824, as compared with £14,649 in the corresponding period. Wages increased by £2,000, and allowances from £3,700 to £4,400. Car works expenditure is up by £1,800, and permanent way and electrical equipment by £1,300.

Dick, Kerr & Co., Ltd.—The report for the year ended June 30 issued on Tuesday, shows a notable improvement on the previous year. The profit earned during the past twelve months amounted to £71,740, an increase of £24,781. This enables the directors to make all necessary provisions and to recommend a dividend of 6 per cent. on the ordinary share capital, while carrying forward a balance of £20,307. A comparison of the figures for the past five years is appended:—

Year ended June	1916	1915	1914	1913	1912
	£	£	£	£	£
Net profits	71,740	46,959	44,701	30,092	33,275
Balance from last year	18,347	25,526	10,325	10,016	30,802
	90,087	72,485	55,086	40,108	40,107
Deb. int. & trustees' fees	10,490	10,538	10,661	11,183	11,551
Prem. on deb. stock redeemed	300	300	300	300	300
Divd. on 6 per cent. pref. shares... ...	18,300	18,300	18,300	18,300	18,300
Divd. on 6 per cent. ord. shares	15,000	—	—	—	—
Reserve against contingencies	25,000	25,000	—	—	—
Bal. carried forward ...	20,307	18,346	25,525	10,325	10,016

During the past year, in addition to extensions of contracts for the supply of war material, which have kept the works at Preston and Kilmarnock fully occupied, the Government entrusted to the company the construction, equipment and management of one of the National factories, which is now approaching full output. The control of Messrs. Willans and Robinson, Ltd., has also been acquired, and the directors anticipate that this will be of considerable value in the future expansion of business.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-four of the principal tramway undertakings in the United Kingdom for the week ended October 7 give total receipts of £100,843, or £17,567 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or sixty-six more than for the corresponding week. The receipts this year were at the rate of £85 11*s.* 7*d.* per mile of single track, and last year at the rate of £80 2*s.* 2*d.*, thus showing an increase for the week of £5 9*s.* 5*d.* per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

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ABCHURCH YARD, CANNON STREET,
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ENGINEERS & CONTRACTORS.
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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

DIVIDENDS. PREV.	DIVIDENDS. LAST.	NAME.	PAID.	PRICE, JULY 27, 1914	CASH. Oct. 19.	A WEEK AGO.
5%	5%	Alabama Traction. 5% 1st. Mt.	—	67	70½	69½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4½	65/-	62/6
4%	4%	Do. 4% Deb. ...	100	91	69	74
4½%	4½%	Do. 4½% Deb. ...	100	98½	74	77½
5%	5%	Do. 5% Deb. ...	100	96	70½	71
1/-	7d	Auckland Elec. Trams. Ord. ...	1	1⅝	21/-	21/-
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	93¾	93¾
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅛	10⅝	10⅝
4½%	4½%	Do. 4½% Deb....	100	96	83	83
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	91½	91½
$1	$1	Brazilian Trac. & Power Ord....	$100	66	58⅛	56⅝
$1½	$1½	Do. 6% Cum. Pref.	$100	97	92¼	93¾
4/-	4/-	Brisbane Elec. Trams. Otd. ...	5	7½	7	7
2/6	2/6	Do. 5% Cum. Pref.	5	5	85/-	85/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	58½	58½
6%	5%	Do. Pref. Ord....	100	106	56½	59
5%	5%	Do. 5% Cum. Pref.	100	103	72½	74
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	88⅛xd	89
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	67½	68½
—	£3	Brit. Elec. Trac. Ord.	100	—	35	36½
—	6%*	Do. 6% Cum. Part Pref. ...	100	—	78	79
5%	5%	Do. 5% Deb.	100	92	83½	83xd
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	71	70⅝
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	81½	81½
3/-	6/6	Calcutta Tramways, Ord. ...	5	7½	6½	6½
1/3	1/3	City of B.A. Trams.	5	5½	90	90
5/-	4/-	Dublin United Trys 6% Pref.	10	12	11	11
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79⅝	79⅝
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	27/6	27/6
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅞	2/1½	2/1½
6/-	6/6	Lanarkshire Trys. Co.	10	10½	9⅜	9⅜
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9d.	9d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	1⅛	2/4½	2/4½
6d.	6d.	Do. 5% Pref.	1	1/6	8/6	8/3⅜
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	63½	62½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	89½	90
5%	5%	Do. 5% Inc. Deb.	100	88½	81	81½
4%	4%	Lon. Unl. Trms. 4% 1st Mt. Db.	100	55	47⅛	47⅛
3/-	3/-	Madras Elec. 6% Pref. ...	5	5⅞	96/6	96/6xd
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	66½	66½
6%	6%	Manila Elec. R. R. & Light ...	$100	102	66½	68
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	78	78
$1½	$1½	Mexico Trams. Common ...	$100	70	32½	32½
5%	5%	Do. 1 Mt. 5% G.B.	—	84	43½	43½
6%	6%	Do. 6% Mt. Bds.	100	76	34	34
4½%	4½%	Montreal St.4½%Stg.Debs.(1922)	100	100	94½	94½
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95	95½
1/2*	1/2*	National Steam Car	1	1⅝	20/1½	19/1½
9d.*	9d.*	New General Traction	1	⅞	7/9½	7/9½
6d.	8d.	Northern Gen. Trans. Ord. ...	1	⅞	15/4½	15/4½xd
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	70/-	70/-
5%	5%	Do. 5% 1st Deb.	100	89½	74½	74½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80½	80½
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	⅝	11/3	11/-
10d.	8d.	Provincial Trams. Ord.... ...	1	⅞	17/-	17/-
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84/-	84xd
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	91½	92½
5%	5%	1st. Mt. 5% 50 yr.	100	89½	75	77xd
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	90	91½
5%	5%	Do. 5% Perp. Deb.	100	99½	81½	81½
—	—	Singapore Elec. Trams	5/-	½	4/10½	4/10½
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	96½	96½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	82½xd	82½
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	95	95
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	77	77xd
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	9/3	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4½	99/6	90/-
—	—	Metropolitan Dist. Ord. ...	100	21½	16½	17
—	—	Undgd. Elec. Rys. of London ...	10	2½	36/10½	37/-
		Do. "A"	1/-	⅜	5/3	5/9
4½	4½	Do. 4½% Bds of 1933 Rd.	—	99	101½	101
6	6	Do. 6% 1st Cum. In. Db.	100	114	105½	106½
6	6	Do. 6% In. Bonds Rd. ...	—	88	89	89½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1915	Latest Return. 1916	Aggregate. Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	Oct. 14	£53,405	£53,349	42	£2,085,249	— £2,063
Auckland.....(28 days)	Aug.*25	19,876	20,469	8	41,974	— 55
Ballarat and Bendigo ...	Aug. 13	2,860	2,791	20	15,870	+ 836
Brazilian Traction Mlrs.	Aug.	6,576 000	7,184,000	35	54,329,000	+3,365,890
Brisbane	Sept.	30,360	32,530	39	297,660	+ 22,586
British Columbia.....$	Aug.	507,126	550,293	9	1,088,586	+ 70,737
Buenos Aires Lacroze ...	Sept. 3	39,355	37,075	13	111,945	+ 10,338
Burmah Tramway ... Rs.	Sept.	22 163	23,749	9	48,161	— 839
Calcutta.....Rs.	Oct. 14	69,492	64,042	42	2,792,419	+ 130,534
Cape Town	Aug.	...	13,394	...	...	...
Carthagena & Herrerias..	Sept.	1,252	1,779	39	22,600	+ 7,020
Cordoba	Aug.	14,159	13,852	22	71,165	+ 469
East India	Sept.	2,054	2,523	9	6,045	+ 725
Hong Kong .....$	Sept. 16	11,424	16,525	40	541,227	+ 134,631
Kalgoorlie	July	2,775	2,521	31	17,458	— 1,496
La Plata	Sept.	3,894	3,994	39	37,622	— 257
Lima	Aug.	32.004	33,395	25	270,710	+ 12,959
Lisbon .....Escu.	Aug.	...	203,703	...	...	...
Madras .....(2 weeks)	Oct. 15	29,529	32,305	41	602,091	+ 44,501
Manila	July	23,750	32,700	31	887,739	+ 39,986
Manaos .....Rs.	Aug.	...	147,774	...	...	...
Melbourne	May	...	69,275	...	...	...
Montevideo	Sept.	25,070	26,711	48	319,043	+ 15,626
Pernambuco	Oct. 15	3,070	3,216	41½	124,153	— 2,154
Peruvian .....$	Sept.	755,280	911,910	13	2,643,240	+ 344,083
Port Elizabeth	Aug.	...	2,863	...	...	...
Rangoon	Sept.	4,445	4,137	39	41,328	— 2,001
Shanghai .....$	Oct. 13	28,298	33,337	...	...	...
Singapore .....$	Sept. 9	12,327	13,313	36	451,406	+ 46,879
Toronto.....$	Aug.	762,627	889,241	35	7,092,229	+ 746,526
Winnipeg	Aug.	251,189	249,795	35	2,193,957	— 57,510

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	Latest Return. 1916	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Aggregate. Incr. or Dec.
Aberdare U.D.C.	Oct. 3	£377	£443	+ 66	27	£10,644	+ £1,217
Aberdeen Corporation...	„ 11	1,673	1,880	+ 207	19	37,749	+ 2,127
Accrington Corp.	Sept. 27	584	670	+ 86	26	15,524	+ 557
Ayr Corporation	Oct. 14	276	300	+ 24	22	11,843	+ 960
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	„ 15	1,408	1,598	+ 190	28½	46,175	+ 4,227
Birmingham Corp.	„ 14	15,348	14,725	— 623	28	466,092	+ 67,029
Do. Motor Omnibuses	„ 14	891	1,058	+ 167	28	28,357	+ 3,527
Blackburn Corp.	„ 11	1,188	1,123	— 65	28½	1,123	— 1,090
Blackpool & Fleetwood.	„ 14	496	566	+ 70	41	40,326	+ 4,781
Blackpool Corp.	*	...	...	...	...	...	...
Bolton Corporation	„ 15	2,698	2,853	+ 155	29	84,253	+ 5,798
Bournemouth Corp.	„ 18	1,977	2,118	+ 141	29	71,212	+ 4,922
Bradford Corporation ...	„ 14	6,616	6,928	+ 312	28	197,992	+ 6,837
Brighton Corporation ...	„ 5	1,067	1,231	+ 164	28½	38,861	+ 3,887
Bristol	„ 13	9,282	10,321	+ 1,039	41	415.109	+ 20,932
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation	„ 14	1,615	1,678	+ 63	29	50,428	+ 2,795
Burton-on-Trent Corp...	„ 15	274	310	+ 36	28	7,941	— 543
Bury Corporation	„ 15	1,313	1,410	+ 97	29½	42,366	+ 1,986
Cardiff Corporation	Sept. 30	2,717	3,151	+ 434	26	80,293	+ 6,685
Chatham & District	Oct. 12	1,220	1,343	+ 123	41	50,861	+ 2,319
Chesterfield Corp.	„ 6	266	301	+ 35	27	7,788	+ 11
Colne Corporation	„ 4	258	259	+ 1	...	...	...
Cork Electric	„ 12	522	567	+ 45	41	21,092	+ 239
Croydon Corporation ...	*	...	...	...	...	...	...
Derby Corporation	„ 14	1,052	1,180	+ 128	28½	32,879	+ 2,242
Dover Corporation	*	...	...	...	...	...	...
Dublin & Lucan	„ 13	149	148	— 1	15	2,777	+ 216
Dublin United	„ 13	6,241	6,549	+ 308	41	249,786	— 1,454
Dundee City	„ 11	1,395	1,394	— 1	21½	30,466	+ 751
East Ham Corporation	„ 14	1,298	1,317	+ 19	28½	37,858	+ 184
Exeter Corporation	„ 13	370	427	+ 57	28	11,753	+ 410
Glasgow Corporation	„ 14	22,551	23,899	+ 1,348	19⅜	457,327	+ 32,125
Glasgow Subway	„ 14	1,064	1,169	+ 105	41	46,732	+ 4,095
Glossop (U. Elec. Supp.)	„ 14	133	146	+ 13	42	5,854	+ 576
Halifax Corporation	„ 10	2,094	2,044	— 50	27⅜	65,210	+ 961
Do. Motor Omnibuses	„ 10	49	49	nil	27⅜	1,407	— 55
Hastings & District	„ 13	956	960	+ 4	41	44,351	+ 2,811
Huddersfield Corp.	„ 14	2,526	2,790	+ 264	28	84.745	+ 7,190
Hull Corporation	„ 14	3,078	3,269	+ 191	28	88,505	+ 1,371
Ilford U.D.C.	„ 14	608	677	+ 69	28	19,896	+ 1,036
Ilkeston Corporation ...	*	...	...	...	...	...	...
Ipswich Corporation	„ 14	518	471	— 47	28	15,609	— 774
Isle of Thanet	„ 14	330	336	+ 6	2	674	— 111
Kilmarnock Corp.	„ 14	162	174	+ 12	21⅞	3,900	+ 54
Lanarkshire	„ 12	2,152	2,416	+ 264	41	95,179	+ 14,174
Lancashire United	„ 11	1,734	1,873	+ 139	41	75,532	+ 3,692
Leeds City	„ 14	8,817	9,909	+ 1,092	29	282,787	+ 25,338
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	„ 14	776	867	+ 91	21⅞	19,651	+ 2,349
Leyton U.D.C.	„ 12	1,584	1,557	— 27	28	48,425	+ 963
Liverpool Corporation...	„ 14	13,665	14,943	+ 1,278	41½	581,305	+ 29,900
Llandudno & Colwyn B.	„ 13	276	316	+ 40	45½	17,218	+ 1,055
London County Council	„ 4	45,729	50,215	+ 4,486	26½	1,309,893	+ 134,937
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation...	*	...	...	...	...	...	...
Maidstone Corporation...	„ 12	226	221	— 5	28	6,408	— 173
Manchester Corp.	„ 14	18,281	19,216	+ 935	28	539,557	+ 29,090
Met. Elec. Trys.	*	...	...	...	...	...	...
National Steam Car	*	...	...	...	...	...	...
Nelson Corporation	„ 14	182	196	+ 14	28½	6,198	+ 476
N'castle-on-Tyne Corp.	„ 7	6,509	7,123	+ 614	27	182,298	+ 6,208
Newport (Mon.) Corp....	„ 14	822	982	+ 160	28	27,325	+ 2,857
New St. Helens & Dist.	„ 11	982	1,075	+ 93	15	18,161	+ 1,077
Northampton Corp.	„ 13	686	721	+ 35	28	20,241	— 1,292
Nottingham Corp.	„ 12	3,773	4,077	+ 304	28	111,526	+ 4,350
Oldham Corporation ...	„ 15	2,352	2,468	+ 116	29	74,112	+ 4,321
Portsmouth Corp.	„ 14	2,362	2,686	+ 324	...	...	...
Preston Corporation	„ 11	954	1,177	+ 223	27⅞	31,144	+ 3,675
Provincial	„ 14	2,246	2,373	+ 127	2	4,655	+ 188
Reading Corporation	„ 12	768	930	+ 162	27⅞	24,458	+ 1,695
Rhondda Tramways	„ 12	1,271	1,383	+ 12	41	52,798	+ 4,429
Rochdale Corporation...	„ 14	1,710	1,784	+ 74	28½	52,542	+ 2,091
Rotherham Corp.	„ 18	1,167	1,590	+ 423	28⅜	44,931	+ 11,280
Salford Corporation	„ 16	5,279	5,413	+ 134	27⅜	159,444	+ 8,173
Sheffield Corporation....	„ 15	9.331	10,708	+ 1,377	29½	308.323	+ 48,239
Southampton Corp.	„ 11	1,548	1,771	+ 223	27⅞	47,576	+ 4,117
Southend-on-Sea Corp...	„ 11	699	833	+ 134	28	29,446	+ 3,362
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	„ 14	775	854	+ 79	28½	24,214	+ 1,087
Sunderland Corp.	„ 15	1,502	1,667	+ 165	28	47,222	+ 3,476
Sunderland District...	„ 11	1,034	888	— 146	49	30,998	+ 2,037
Swindon Corporation ...	„ 11	196	209	+ 13	27⅞	5,851	+ 142
Torquay Tramways	„ 12	526	592	+ 66	41	25,283	+ 1,937
Tyneside Trys. & Tmrds.	„ 4	593	636	+ 43	14	9,974	+ 728
Wallasey Corporation ...	„ 4	1,191	1,320	+ 129	28½	41,066	+ 2,385
Walsall Corporation	„ 14	798	842	+ 44	42	33,955	+ 3,206
Walthamstow U.D.C.	„ 14	805	1,058	+ 253	28	32,532	+ 5,205
Warrington Corp.	Sept. 28	466	535	+ 69	26	12,887	+ 1,014
West Ham Corporation	Oct. 12	3,086	3,287	+ 201	27⅜	92,318	+ 3,492
Wigan Corporation	„ 11	1,597	1,719	+ 122	28	47,478	+ 4,017
Yorkshire (W. Riding)...	„ 15	1,579	1,803	+ 224	42	74,153	+ 7,283

* Issue of Traffic Returns suspended during the War.

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Birmingham Power Station Breakdown.—When the shaft of the defective turbine at Nechells generating station was examined it was found not to be fractured as was at first reported. The electricity department therefore hope to have the plant in full operation about the end of next week. Meanwhile the tramway service has been restricted, and in case another breakdown occurred the conductors were provided with special tickets to be given to passengers to enable them to complete the journey on some other occasion without incurring extra expense. One such stoppage happened for an hour before midday on October 16. On the same day a new generator, weighing about 34 tons, was being conveyed to the works, when it was thrown from the trolley and fell against a house, owing to the roadway falling in. During the week there has been a great rush on the railway service. In a report presented to the City Council on Tuesday last the Electricity Committee stated that the several interruptions of the supply during the past 18 months were due to the severe strain imposed on the plant by the numerous munition establishments. The boilers were designed for a low grade of fuel, but the heavy load thrown upon them could only be met by forcing the boilers and by the employment of a higher grade of fuel. At a meeting of the Corporation on October 17, Councillor Harrison Barrow, chairman of the Tramways Committee, criticised the Electricity Committee for lack of foresight, and said that if the 1913 scheme had been carried out the present difficulties would not have arisen. In three days alone the tramways had lost nearly £2,000. In reply Alderman Jephcott, chairman of the Electricity Committee, said it was impossible to conserve power for certain parts of the day, as there were no storage batteries.

PERSONAL.

Mr. Louis Slattery will enter upon his new duties as general manager of West Ham Corporation Tramways on November 1.

Chief Inspector A. W. Baker, Doncaster Corporation Tramways, has been appointed traffic superintendent, filling the vacancy caused by the resignation of Mr. A. M. Strachan.

Mr. Harry Lotery, of Messrs. H. Lotery and Company, Ltd., uniform clothing contractors, of 4 to 8, St. Mary Street, London, N.E., has been elected a member of the Stepney Borough Council.

Alderman J. H. Hargreaves, who was asked to serve for a fourth year as Lord Mayor of Hull, has had to decline the honour owing to ill-health. For a number of years until the present year the alderman was chairman of the Tramways Committee.

Mr. Conway, who has held important positions in various light and power companies, has proceeded to Mexico at the request of the committee who are acting in the interest of the Mexico Tramways' Light and Power group of companies, owing to the unsettled condition of that country.

Mr. A. C. Cramb, borough electrical engineer, Croydon, has received a communication from the chairman of the Metropolitan Munitions Committee expressing appreciation of the thoroughness with which the committee's work has been carried out in the district of which he has been the honorary manager.

We regret to announce the death of Mr. W. Gordon Davies, traffic manager of the Chatham and District Light Railways Company.

CONTRACTS AND ORDERS.

The Motor Rail and Tramcar Company Ltd., recently supplied a number of petrol tractors and parts to the War Department.

Ford Motor Company (England), Ltd., have a contract to supply motor delivery vans to the War Department.

Barking Council have adopted the following tenders: Siemens Bros.' Dynamo Works, cable; Babcock and Wilcox, Ltd., chain-grate stoker, superheater, etc.; General Electric Co., switchgear.

Sheffield Corporation have placed the following contracts for the supply of spare apparatus for the auxiliary plant at Neepsend station: Siemens Bros.' Dynamo Works, motors and transformer; Dick, Kerr and Co., British Westinghouse Co., and Fuller Electrical Co., motors; Igranic Electric Co., motor starters.

Manchester Corporation have placed the following contracts:—Grange Iron Co., Ltd., ash hopper; Etchells, Congdon and Muir, Ltd., hoist gear, etc.; Aiton and Co., Ltd., steam and feed pipes and supports, including alterations to existing pipework to two boilers; Avonside Engine Co., Ltd., Bristol, saddle-tank steam locomotive; R. White and Son, Widnes, second-hand railway material; F. W. Brackett and Co., Ltd., water screen; F. Mitchell and Son, Ltd., foundations for wagon lift and turntable; British Thomson-Houston Co., Ltd., switchgear and switchboard; Mather and Platt, Ltd., electrically-driven circulating water-pump; Ferranti, Ltd., extension switchgear, etc.; Stewarts and Lloyds, high-pressure pipework; cables: Callender's Cable and Construction Co., Ltd., British Insulated and Helsby Cables, Ltd., Pirelli General Cable Works, Ltd., C. Macintosh and Co., Ltd., Johnson and Phillips, Ltd.

FINANCIAL REPORTS AND MEETINGS.

Sao Paulo Tramway, Light and Power.—The directors have declared a dividend of 2½ per cent. on common stock.

Rio de Janeiro Tramway, Light and Power Company.—A dividend is announced of 1¾ per cent. on the capital stock.

Calcutta Tramways Company.—An interim dividend on the ordinary shares of 3 per cent. is announced.

Callender's Cable and Construction Company.—The board have declared an interim dividend on the ordinary shares of 5s. per share (10 per cent. per annum).

Brisbane Electric Tramways and Investment Company. A dividend has been declared at the rate of 8 per cent. per annum (4s. per share), free of tax, on the ordinary shares for the past half-year.

Half-yearly Results at Bradford.—The general manager on October 16 presented the appended comparative half-yearly return to the Tramways Committee:—

	1916.	1915.	Increase
Traffic receipts (incl. parcels)	£184,572	£175,962	£8,610
Car mileage	3,100,153	3,143,150	10,997
Receipts per car mile ..	14.01*d.*	13.43*d.*	.58*d.*
Units consumed	6,228,912	6,097,351	131,561
Units per car mile	1.971	1.940	.032
Passengers carried	40,148,066	37,975,411	2,172,655
Wages on revenue account, including permanent way ..	£75,332	£69,346	£5,986

Belfast Tramways Half-yearly Report.—For the six months ended Sept. 30, the working of the Corporation Tramways undertaking shows a surplus profit of £3,883, as against £8,380 for the similar period of 1915. The revenue was £151,980, as compared with £141,580, an increase of £10,400. There was no appreciable increase in car mileage. The receipts per car mile were 11.58*d.*, as against 11.01*d.* for the corresponding period of 1915. The average receipts per car mile for September was the highest yet reached—viz., 11.93*d.*, while the working expenses were also a record—7.03*d.* The increase in the revenue is balanced by a rise of £11,000 in the expenditure, the aggregate being £80,723, as against £78,189 for the same period in 1915. The increased expenditure is due to higher payments for wages, war allowances, sinking fund, income tax, track and car maintenance and electrical energy, the latter total being £20,824, as compared with £14,049 in the corresponding period. Wages increased by £2,000, and allowances from £3,700 to £4,400. Car works expenditure is up by £1,800, and permanent way and electrical equipment by £1,300.

Dick, Kerr & Co., Ltd.—The report for the year ended June 30 issued on Tuesday, shows a notable improvement on the previous year. The profit earned during the past twelve months amounted to £71,740, an increase of £24,781. This enables the directors to make all necessary provisions and to recommend a dividend of 6 per cent. on the ordinary share capital while carrying forward a balance of £20,307. A comparison of the figures for the past five years is appended:—

Year ended June	1916	1915	1914	1913	1912
	£	£	£	£	£
Net profits	71,740	46,959	44,761	30,062	3,275
Balance from last year	18,347	25,526	10,325	10,016	30,802
	90,087	72,485	55,086	40,108	40,107
Deb. int. & trustees' fees	10,450	10,538	10,601	11,183	11,551
Prem. on deb. stock redeemed	300	300	300	300	300
Divd. on 6 per cent. pref. shares... ...	18,300	18,300	18,300	18,300	18,300
Divd. on 6 per cent. ord. shares... ...	15,000	—	—	—	—
Reserve against contingencies	25,000	25,000	—	—	—
Bal. carried forward ...	20,307	18,346	25,525	10,325	10,016

During the past year, in addition to extensions of contracts for the supply of war material, which have kept the works at Preston and Kilmarnock fully occupied, the Government entrusted to the company the construction, equipment and management of one of the National factories, which is now approaching full output. The control of Messrs. Willans and Robinson, Ltd., has also been acquired, and the directors anticipate that this will be of considerable value in the future expansion of business.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-four of the principal tramway undertakings in the United Kingdom for the week ended October 7 give total receipts of £100,843, or £17,567 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or sixty-six more than for the corresponding week. The receipts this year were at the rate of £85 11*s.* 7*d* per mile of single track, and last year at the rate of £80 2*s.* 2*d.*, thus showing an increase for the week of £5 9*s.* 5*d.* per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27, 1914	Cash. Oct. 19.	A Week Ago.
5%	5%	Alabama Traction. 5% 1st. Mt.	—	67	70¾	69½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4¾	65/-	62/6
4%	4%	Do. 4% Deb. ...	100	91	69	74
4½%	4½%	Do. 4½% Deb. ...	100	98½	74	77½
5%	5%	Do. 5% Deb. ...	100	96	70½	71
1/-	7d	Auckland Elec. Trams. Ord. ...	1	1⅜	21/-	21/-
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	93¾	93¾
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅛	10⅜	10⅜
4½%	4½%	Do. 4½% Deb....	100	96	83	83
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	91½	91½
$1	$1	Brazilian Trac. & Power Ord....	$100	66	58½	56½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	92½	93½
4/-	4/-	Brisbane Elec. Trams. Otd. ...	5	7¼	7	7
2/6	2/6	Do. 5% Cum. Pref.	5	5	85/-	85/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	58½	58½
6%	5%	Do. Pref. Ord....	100	106	56½	59
5%	5%	Do. 5% Cum. Pref.	100	103	72½	74
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	88½xd	89
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	67½	68½
—	£3	Brit. Elec. Trac. Ord.	100	—	35	36½
—	6%*	Do. 6% Cum. Part Pref. ...	100	—	78	79
5%	5%	Do. 5% Deb.	100	92	83½	83xd
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	71	70½
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	81½	81½
3/-	6/6	Calcutta Tramways, Ord. ...	5	7½	6½	6½
1/3	1/3	City of B.A. Trams.	5	5⅛	90	90
5/-	4/-	Dublin United Trys 6% Pref.	10	12	11	11
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	27/6	27/6
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅞	2/1½	2/1½
6/-	6/6	Lanarkshire Trys. Co.	10	10½	9⅝	9⅝
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9½d.	9½d.	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	1⅛	2/4½	2/4½
6d.	6d.	Do. 5% Pref.	1	⅝	8/6	8/3½
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	63½	62⅝
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	89⅝	90
5%	5%	Do. 5% Inc. Deb.	100	88½	81	81½
4%	4%	Lon. Unt. Trns. 4% 1st Mt. Db.	100	55	47⅛	47⅛
3/-	3/-	Madras Elec. 6% Pref. ...	5	5⅛	96/6	96/6xd
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	66¾	66¾
8½	8½	Manila Elec. R. R. & Light ...	$100	102	66½	68
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	78	78
8½	8½	Mexico Trams. Common ...	$100	70	32½	32½
5%	5%	Do. 1 Mt. 5% G.B.	—	84	43¾	43¾
6%	6%	Do. 6% Mt. Bds.	100	76	34	34
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	94½	94½
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95	95½
1/2*	1/2½*	National Steam Car	1	⅛	20/1½	19/1½
9½d.*	9½d.*	New General Traction	1	⅛	7/9½	7/9½
6d.	8½d.	Northern Gen. Trans. Ord. ...	1	⅜	15/4½	15/4½xd
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	70/-	70/-
5%	5%	Do. 5% 1st Deb.	100	89½	74½	74½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80½	80½
6d.	6d.	Potteries Elec. Train. 5% Pref.	1	1⅛	11/3	11/-
10d.	8d.	Provincial Trams. Ord.	1	⅜	17/-	17/-
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84/-	84xd
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	91½	92½
5%	5%	1st. Mt. 5% 50 yr.	100	89½	75	77xd
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	90	91½
5%	5%	Do. 5% Perp. Deb.	100	99½	81½	81½
—	—	Singapore Elec. Trams	5/-	¼	4/10½	4/10½
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	96½	96½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	82½xd	82½
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	95	95
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	77	77xd
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	9/3	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	90/6	90/-
—	—	Metropolitan Dist. Ord. ...	100	21⅜	16½	17
—	—	Undgd. Elec. Rys. of London ...	10	2½	36/10½	37/-
		Do. "A"	1/-	⅜	5/3	5/9
4½	4½	Do. 4½% Bds of 1933 Rd.	—	99	101½	101
6	6	Do. 6% 1st Cum. In. Db.	100	114	105½	106½
6	6	Do. 6% In. Bonds Rd. ...	—	88	89	89½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1915	Latest Return. 1916	Aggregate. Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	Oct. 14	£53,405	£53,349	42	£2,085,249	— £2,063
Auckland.....(28 days)	Aug.*25	19,876	20,469	8	41,974	— 55
Ballarat and Bendigo ...	Aug. 13	2,860	2,791	20	15,870	+ 836
Brazilian Traction Mlrs.	Aug.	6,576,000	7,184,000	35	54,329,000	+3,365,890
Brisbane	Sept.	30,360	32,530	39	297,660	+ 22,586
British Columbia.....$	Aug.	507,126	550,293	9	1,088,586	+ 70,737
Buenos Aires Lacroze ...	Sept. 3	39,355	37,075	13	111,945	+ 10,338
Burmah Tramway ... Rs.	Sept.	22 163	23,749	9	48,161	— 839
Calcutta.....Rs.	Oct. 14	69,492	64,042	42	2,792,419	+ 130,534
Cape Town	Aug.	...	13,394	...	...	...
Carthagena & Herrerias..	Sept.	1,252	1,779	39	22,600	+ 7,020
Cordoba	Aug.	14,159	13,852	22	71,165	+ 469
East India	Sept.	2,054	2,523	9	5,045	+ 725
Hong Kong .....$	Sept. 16	11,424	16,525	40	541,227	+ 134,531
Kalgoorlie	July	2,775	2,521	31	17,458	— 1,496
La Plata	Sept.	3,894	3,994	39	37,622	— 257
Lima	Aug.	32.004	33,395	35	270,710	+ 12,959
Lisbon .....Escu.	Aug.	...	203,703	...	...	...
Madras .....(2 weeks)	Oct. 15	29,529	32,305	41	602,091	+ 44,501
Manila	July	23,750	32,700	31	887,739	+ 39,986
Manaos .....Rs.	Aug.	...	147,774	...	...	...
Melbourne.....	May	...	69,275	...	...	...
Montevideo.....	Sept.	25,070	26,711	48	319,043	+ 15,626
Pernambuco	Oct. 15	3,070	3,216	41½	124,153	— 2,154
Peruvian .....$	Sept.	755,280	911,910	13	2,643,240	+ 344,083
Port Elizabeth	Aug.	...	2,863	...	...	...
Rangoon	Sept.	4,445	4.137	39	41,328	— 2,001
Shanghai .....$	Oct. 13	28,298	33,337	...	...	...
Singapore .....$	Sept. 9	12,327	13,313	36	451,406	+ 46,879
Toronto.....$	Aug.	762,627	889,241	35	7,092,229	+ 746,526
Winnipeg	Aug.	251,189	249,795	35	2,193,957	— 57,510

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Name.	Week ended	Latest Return. 1915	Latest Return. 1916	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Aggregate. Incr. or Dec.
Aberdare U.D.C.	Oct. 3	£377	£448	+ 66	27	£10,644	+ £1,217
Aberdeen Corporation...	,, 11	1,673	1,880	+ 207	19	37,749	+ 2,127
Accrington Corp.....	Sept. 27	584	670	+ 86	26	15,524	+ 557
Ayr Corporation	Oct. 14	276	300	+ 24	22	11,343	+ 960
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.....	,, 15	1,408	1,598	+ 190	28½	44,175	+ 4,227
Birmingham Corp.	,, 14	15,348	14,725	— 623	28	466,092	+ 67,029
Do. Motor Omnibuses	,, 14	891	1,058	+ 167	28	28,357	+ 3,527
Blackburn Corp.	,, 11	1,188	1,123	— 65	28½	1,123	— 1,090
Blackpool & Fleetwood.	,, 14	496	566	+ 70	41	40,326	+ 4,781
Blackpool Corp.	*	...	...	...	...	...	...
Bolton Corporation.....	,, 15	2,698	2,853	+ 155	29	84,253	+ 5,798
Bournemouth Corp.....	,, 18	1,977	2,118	+ 141	29	71,212	+ 4,922
Bradford Corporation ...	,, 14	6,616	6,928	+ 312	28	197,992	+ 6,837
Brighton Corporation ...	,, 5	1,067	1,231	+ 164	28½	38,861	+ 3,887
Bristol	,, 13	9,282	10,321	+ 1,039	41	415.109	+ 20,932
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	,, 14	1,615	1,678	+ 63	29	50,428	+ 2,795
Burton-on-Trent Corp...	,, 15	274	310	+ 36	28	7,941	— 543
Bury Corporation.....	,, 15	1,313	1,410	+ 97	29½	42,366	+ 1,986
Cardiff Corporation.....	Sept. 30	2,727	3,151	+ 434	26	80,293	+ 6,685
Chatham & District.....	Oct. 12	1,220	1,343	+ 123	41	50,881	+ 2,319
Chesterfield Corp.	,, 6	266	301	+ 35	27	7,788	+ 11
Colne Corporation	,, 4	258	259	+ 1	...	...	...
Cork Electric	,, 12	522	567	+ 45	41	21,092	+ 239
Croydon Corporation ...	*	...	...	...	...	...	...
Derby Corporation	,, 14	1,052	1,180	+ 128	28½	32,879	+ 2,242
Dover Corporation	*	...	...	...	...	...	...
Dublin & Lucan	,, 13	149	148	— 1	15	2,777	+ 216
Dublin United	,, 13	6,241	6,549	+ 308	41	249,786	— 1,454
Dundee City	,, 11	1,395	1,394	— 1	21½	30,466	+ 751
East Ham Corporation ...	,, 14	1,298	1,317	+ 19	28½	37,858	+ 184
Exeter Corporation.....	,, 13	370	427	+ 57	28	11,753	+ 410
Glasgow Corporation	,, 14	22,551	23,899	+ 1,348	19½	457,327	+ 32,125
Glasgow Subway.....	,, 14	1,064	1,169	+ 105	41	46,732	+ 4,095
Glossop (U. Elec. Supp.)	,, 14	133	146	+ 13	42	5,854	+ 576
Halifax Corporation.....	,, 10	2,094	2,044	— 50	27⅜	65,210	+ 961
Do. Motor Omnibuses	,, 10	49	49	nil	27½	1,407	— 55
Hastings & District.....	,, 13	956	960	+ 4	41	44,351	+ 2,511
Huddersfield Corp.	,, 14	2,526	2,790	+ 264	28	84.745	+ 7,190
Hull Corporation	,, 14	3,078	3,269	+ 191	28	88.505	+ 1,371
Ilford U.D.C.	,, 14	608	677	+ 69	28	19,896	+ 1,036
Ilkeston Corporation ...	*	...	...	...	...	...	...
Ipswich Corporation	,, 14	518	471	— 47	28	15,609	— 774
Isle of Thanet	,, 14	330	336	+ 6	2	674	— 111
Kilmarnock Corp.	,, 14	162	174	+ 12	21½	3,900	+ 54
Lanarkshire	,, 12	2,152	2,416	+ 264	41	95,179	+ 14,174
Lancashire United	,, 11	1,734	1,873	+ 139	41	75.532	+ 3,692
Leeds City.....	,, 14	8,817	9,909	+ 1,092	29	282,787	+ 25,338
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	,, 14	776	867	+ 91	21½	19,651	+ 2,349
Leyton U.D.C.....	,, 12	1,584	1,557	— 27	26	48,425	+ 963
Liverpool Corporation....	,, 14	13,665	14,943	+ 1,278	41½	581,305	+ 29,900
Llandudno & Colwyn B.	,, 13	276	316	+ 40	45½	17,218	+ 1,055
London County Council	,, 4	45,729	50,215	+ 4,486	26½	1,309,893	+ 134,937
London Genl. Omnibus	*	...	...	...	...	...	...
London United.....	*	...	...	...	...	...	...
Lowestoft Corporation...	*	...	...	...	...	...	...
Maidstone Corporation..	,, 12	226	221	— 5	28	6,408	— 173
Manchester Corp.....	,, 14	18,281	19,216	+ 935	28	539,557	+ 29,090
Met. Elec. Trys.	*	...	...	...	...	...	...
National Steam Car.....	*	...	...	...	...	...	...
Nelson Corporation	,, 14	182	196	+ 14	28½	6,198	+ 476
N'castle-on-Tyne Corp.	,, 7	6,509	7,123	+ 614	27	182,298	+ 6,208
Newport (Mon.) Corp....	,, 14	822	982	+ 160	28	27,325	+ 2,857
New St. Helens & Dist.	,, 11	982	1,075	+ 93	15	18,161	+ 1,077
Northampton Corp.....	,, 13	686	721	+ 35	28	20,241	— 1,292
Nottingham Corp.....	,, 12	3,773	4,077	+ 304	28	111,526	+ 4,350
Oldham Corporation ...	,, 15	2,352	2,468	+ 116	29	74,112	+ 4,321
Portsmouth Corp.....	,, 14	2,362	2,686	+ 324	...	...	...
Preston Corporation.....	,, 11	954	1,177	+ 223	27⅜	31,144	+ 3,675
Provincial	,, 14	2,246	2,373	+ 127	2	4,655	+ 188
Reading Corporation.....	,, 12	768	930	+ 162	27½	24,458	+ 1,695
Rhondda Tramways.....	,, 12	1,271	1,383	+ 12	41	52,798	+ 4,429
Rochdale Corporation...	,, 14	1,710	1,784	+ 74	28½	52,542	+ 2,091
Rotherham Corp.....	,, 18	1,167	1,590	+ 423	28½	44,931	+ 11,280
Salford Corporation.....	,, 16	5,279	5,413	+ 134	27⅜	159,444	+ 8,173
Sheffield Corporation....	,, 15	9.331	10,708	+ 1,377	29½	308.323	+ 48,239
Southampton Corp.....	,, 11	1,548	1,771	+ 223	27⅜	47,576	+ 4,117
Southend-on-Sea Corp...	,, 11	699	833	+ 134	28	29,446	+ 3,362
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.....	,, 14	775	854	+ 79	28½	24,214	+ 1,087
Sunderland Corp.....	,, 15	1,502	1,667	+ 165	28	47,222	+ 3,476
Sunderland District...	,, 11	1,034	888	— 146	49	30,998	+ 2,037
Swindon Corporation ...	,, 11	196	209	+ 13	27⅜	5,851	+ 142
Torquay Tramways.....	,, 12	526	592	+ 66	41	25,283	+ 1,937
Tyneside Trys. & Tmrds.	,, 4	593	636	+ 43	14	9,974	+ 728
Wallasey Corporation ...	,, 4	1,191	1,320	+ 129	28½	41,066	+ 2,385
Walsall Corporation.....	,, 14	798	842	+ 44	42	33,955	+ 3,206
Walthamstow U.D.C....	,, 14	805	1,058	+ 253	28	32,532	+ 5,205
Warrington Corp.....	Sept. 28	466	535	+ 69	26	12,887	+ 1,014
West Ham Corporation	Oct. 12	3,086	3,287	+ 201	27½	92,318	+ 3,492
Wigan Corporation	,, 11	1,597	1,719	+ 122	28	47,478	+ 4,017
Yorkshire (W. Riding)...	,, 15	1,579	1,803	+ 224	42	74,153	+ 7,283

* Issue of Traffic Returns suspended during the War.

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CHAPTER IV.—TRACK DESIGN.
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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."

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WEEKLY LIST OF TENDERS INVITED.

GREAT SOUTHERN AND WESTERN RAILWAY (IRELAND).

CONTRACTS FOR THE YEAR ENDING DECEMBER, 1917.

The Directors of the Great Southern and Western Railway Company are prepared to receive tenders for the supply of the undermentioned Stores for twelve months to December 31, 1917, or part of that period :—

	No. of Form		No. of Form
Acid, Sulphuric	3D	Hardware (Sundry)	17
Baskets	10	Incandescent Fittings for Gas	26C
Bolts, Nuts, and Rivets	15	Indiarubber Goods	9A
Brooms and Brushes	13	Implements, Sundry	21
Brass Fittings for carriages	18	Iron Tubes and Fittings	29
Do. do. for Lamps	18A	Iron and Steel Wire	30A
Do. do. for Water	26A	Leather	12
Do. do. for Gas	26B	Linen	8
Bunting	7B	Linoleum	7B
Canvas and Sacks	6	Locks and Keys	19
Carriage Laces	7A	Mats, Fibre	10
Castings, Mall Iron	11	Moroccos	7B
Cement	34	Nails	31
Cloth, Carr. and Uniforms	7C	Oak Keys	35A
Clothing, Oil	9B	Oak Trenails	35B
Do., I.R. proofed	9B	Plumbago	41
Coach Screws and Washers	15	Railway Fastenings (Iron)	16
Colours	2	Rain-water Pipes and Gutters	25
Corks	39	Ropes, Twine and Flax	4
Cotton Waste	5A	Sewer Pipes, Plaster, &c.	32
Crucibles	41	Shovels, Spades, &c.	21A
Curled Hair	7B	Soft Goods	8
Drysalteries	3	Sponge Cloths	5
Emery and Glass Cloth, &c.	28	Signal Wire Pulleys	11
Files and Tool Steel	20	Screws and Split Pins	14
Fire-bricks and Clay	33	Tin-plates	22
Fish-bolts (Steel)	16A	Varnishes	1
Foundry Requisites	42	Waste	5A
Galv. Sheets, Buckets, &c.	23	Waterproof Clothing	9B
Grates, Stoves, and Fenders	24	Wicks	5
Grindstones	28	Wire, Fence and Signal	30A
Glass, Sheet and Plate	27A	Wirework	30B
Glass and China Sundries	27B		
Hair, Curled	7B		

Forms of tender can be obtained on payment of 6*d.* each from the Company's Storekeeper, at the General Stores, Inchicore, Dublin, to whom inquiries for information should be made direct. Patterns may be inspected at the same place on and after the 30th instant, between the hours of 10 a.m. and 4 p.m. (except on Saturdays).

The tenders to be sent in endorsed "Tenders for Stores," and addressed to the undersigned, so as to be with him before 10 o'clock a.m. on Wednesday, November 15, 1916.

The Directors will not consider any tender except those furnished on the company's forms, and do not bind themselves to accept the lowest or any tender.

By order,
ROBERT CRAWFORD,
Secretary.

Kingsbridge Terminus, Dublin.
October, 1916.

COUNTY BOROUGH OF NEWPORT.

ELECTRICITY DEPARTMENT.

The Newport Corporation invite tenders for the supply of Rotary Converters and Switchgear.

Specification and full particulars can be obtained on application to A. Nichols Moore, M.I.E.E., Borough Electrical Engineer, Town Hall. Tenders, which must be enclosed in the official envelope, should be in at my office not later than 10 a.m., November 6, 1916.

ALBERT A. NEWMAN,
Town Clerk.

Town Hall, Newport (Mon.).
October 25, 1916.

MANCHESTER CORPORATION TRAMWAYS.

The Tramways Committee of the Manchester Corporation are prepared to receive tenders for the supply, delivery, and erection of Steam Disinfector. Specifications and forms of tender may be obtained on application to Mr. J. M. McElroy, general manager, Corporation Tramways, 55, Piccadilly, Manchester. Tenders are to be addressed to the Chairman of the Tramways Committee, 55, Piccadilly, Manchester, endorsed "Tender for Disinfector," and must be received not later than 10 a.m. on Tuesday, November 14, 1916.

The Committee do not bind themselves to accept the lowest or any tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester.
October 27, 1916.

COUNTY BOROUGH OF WIGAN.

SUPPLY OF GRANITE SETTS.

The Corporation of Wigan invite tenders for the supply of 300 tons of granite setts to the Tramways Committee. Particulars and form of tender may be obtained from Mr. A. T. Gooseman, Borough Engineer, Wigan. Tenders, endorsed "Granite Setts," to be sent to me not later than Wednesday, November 1 next. The Corporation do not bind themselves to accept the lowest or any tender.

WILLIAM HENRY TYRER,
Town Clerk.

Wigan.
October 18, 1916.

POSITIONS VACANT.

ARMATURE WINDER.

Temporary vacancy for Armature Winder on a Corporation tramways system. Must be accustomed to tramway work and ineligible for the army.—Apply Box No. 28, TRAMWAY AND RAILWAY WORLD.

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The new eastern port of Immingham should particularly attract traders, as its modern equipment and accessibility at any time of the day or night, irrespective of tides, are important time and labour saving factors.

Adjoining the Great Central railroad at various parts of the system are situated Valuable Sites for Works, where, by the introduction of siding accommodation, goods can pass right into and directly out of the works, which greatly assists the manufacturer to attain his desired position in the world's markets.

For information please communicate with the G.C.R. Publicity Office, 216, Marylebone Road, London, N.W.

Owners and agents of land and buildings for sale or to be let near the Great Central Railway are requested to send particulars to the G.C. Estate Office, 12, Paton Street, Piccadilly, Manchester.

SAM FAY, General Manager.

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SATURDAY, OCTOBER 28, 1916.

FURTHER CALL ON TRAMWAY EMPLOYEES.

It is to be hoped that tramway operators do not share the impression that seems to have been held by a manager who applied to a local tribunal for the exemption of a married motorman, 25 years of age, who had been placed in Class A under the Military Service Act. The case was a test one, brought at the instance of the military representative, and fearing the loss of ten such men, the manager asserted that if they were taken the principle would be established that the men were not in an exempted occupation. The truth of the matter is that the certification of public utility undertakings under the Munitions of War Act does not automatically free the employees from liability to render military service to the country. Certified occupations undergo revision from time to time, and besides that revision, the advisory committees to the local tribunals, acting at the instigation of the military representatives, allow demands to be made on the services of the younger men. Consequently claims for exemption have to be made to the tribunals, and if the result is unsatisfactory the cases can be carried to appeal. Proprietors of tramway undertakings, we are confident, do not expect to be more favouraby dealt with than other employers at this grave crisis. It is only now, when men of 41 years are being called up from other occupations, that a demand is made upon tramway managers to give up the fittest of the youngest of their men. When the cases come before the tribunals the military representatives generally express similar views as to the manner in which the vacated places are to be filled, or the loss of the men otherwise atoned for. They put forward two alternatives, viz., a reduction of the services or the use of women as drivers upon the least dangerous routes. Enough instances are now available throughout the country of the success of the latter expedient where cars possess the magnetic brake, to enable the tribunals to announce that the men must go to the army. It must rest with the tramway committees and directors to decide which of the two policies shall be adopted, and if the second course is resolved upon the managers will make the experiment, however much their own feelings may be opposed to the introduction of women to such an employment. As to the attitude of the other employees, no difficulty should arise if the reasons for the course are explained to them. Public opinion will make short work of any threats to strike, and where the undertaking is a certified one the malcontents will find an obstacle that cannot be lightly disregarded. As the winter progresses the further reduction of lighting and the approaching earlier closing of shops may be the means of enabling managers to lessen the strain upon the employees by curtailing the evening services. This course will also have the merit of lessening the consumption of coal. The supply of fuel was stated, at the conference between the Prime Minister and the coal industry's representatives on Wednesday, to have fallen fifteen million tons a year below the amount absolutely necessary, and in default of the miners keeping better time it will, according to the President of the Board of Trade, be necessary to withdraw miners now serving with the army. With such a contingency in view, it is evident that drastic economy in coal consumption becomes imperative; and tramway owners and users may possibly be called upon to make very much greater sacrifices than have hitherto been anticipated. The difficulties that tramway managers have met and overcome since the beginning of the war are a proof that car services will be as fully maintained as is humanly possible under the exigencies of the military requirements.

SUGGESTED INCREASE OF FARES.

Sir Charles Petrie, a former chairman of the Liverpool Tramways Committee, in reviewing the work of the Finance Committee during the municipal year, said he feared that the increased war grants and bonuses would more than absorb any saving the Corporation had been able to effect in response to the request of the Government. The continued strain was such that he urged the several committees to continue to curtail or defer expenditure. To the Tramways Committee he would suggest the advisability of making some re-arrangement of the penny stages. Many overlapping stages might very well be done away with. When everything had gone up in price people could not expect to have three-mile journeys for a penny. In some cities, particularly in Birmingham, re-arrangements of stages were made a year ago, and if in this way the Tramways Committee could contribute £50,000 to the Corporation finances it would be very acceptable. Councillor Russell Taylor, chairman of the Tramways and Electricity Committee, in acknowledging a vote of thanks for his services to the Committee during the past year, said that the past nine months had been a record as regarded the receipts and the number of passengers, although the car mileage had decreased by 56,044. The war had handicapped the department in many directions, and at the end of the year the balance sheet might not be as satisfactory as some would like it to be.

Wigan Corporation have requested the Tramways Committee to reconsider a proposal to increase the fares in order to accumulate a reserve fund to meet the expenses of track renewals in 1920. In the course of the discussion several members expressed no objection to temporary increases: another was of opinion that the war bonuses would become permanent and that the increase in the cost of materials would not decrease to any large extent. Attention was also directed to the damage caused to the track by fast and heavy motor traffic. Councillor Lowe urged that the Tramways Committee could get the extra £4,000 per annum which they required by instituting halfpenny fares. He suggested that this step would gain two million passengers. Councillor Alstead observed that the department were so short of cars that they could not meet the demand at certain times. When that difficulty could be overcome the increased revenue would compensate for any loss that might be sustained in the slack part of the day. Whether the public resented it or not, the increase was a matter of Hobson's choice. Alderman R. T. Fletcher, chairman of the Tramways Committee, said that as a Labour man he was against raising the fares, but their predecessors landed them into abnormal difficulties, notably by borrowing for thirty years on a track with a fifteen years' life. Owing to better management the receipts went up before the war, but when war broke out the takings went down. There was another disaster when the employees had no more sense than to strike, and next came a greater disaster in the breakdown at the generating station. Unless they could accumulate a reserve they would have to ask the ratepayers for upwards of 6*d.* in the pound. Halfpenny fares did not pay even in cities where passengers were "hopping on and off." There was not a manager who was not continually advising their abolition.

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HALFPENNY FARES IN EAST LONDON.

An interesting position has arisen in connection with the proposal to withdraw the halfpenny fares on the tramways of the Leyton, Ilford, East Ham and West Ham Councils, and to substitute a universal penny fare. The authorities proposing that course had also suggested that halfpenny fares should be abolished on their through running cars and on the London County Council cars on the through route. With that object the latter body were asked in August to send representatives to a conference, but it was reported to Leyton Council at the end of September that owing to the vacation the conference had not taken place up to that time. On September 26 Ilford Council and their Tramways Committee, whose general manager was one of the prime movers in the proposal, decided to make no alteration in fares. The action of the Council was based on a report presented by the committee, stating the report on the tramways undertaking for the year ended March 31 last showed that the receipts had increased as well as the expenditure, so that a modification was needed in the statement "Our receipts have not increased in proportion" appearing in the section of the manager's report of July 19 last, headed "Summary of reasons and arguments for the abolition of halfpenny fares." Further reference to the matter was made by Councillor O. Waters, chairman of the Tramways Committee, at a meeting of the Ratepayers' Association. He stated that eighteen months ago he announced that he would not pledge himself against abolishing the halfpenny fares if the public did not support the undertaking. The report for the year ended March 31, 1914, showed a loss of £3,567, without counting the penny rate, while the reserve fell from £7,000 to £2,294. To the reserve they charged the cost of a motor tower wagon, the removal of the centre standards and considerable renewal of the permanent way. For the year ended March, 1915, there was a deficit of £20, without the penny rate, £650 was paid for car repairs, and the penny rate (£1,700) was put to the reserve. At that time the Council rejected Mr. Harvey's proposal to abolish halfpenny fares, only two members supporting it. As the result of the past year's working they had added £1,500 to the reserve, which now stood at over £5 500. War allowances increased from £600 to £1,276, and they had also allowed for an increased charge for energy. It had been stated on several occasions that every halfpenny fare was a loss, but eight penny fares could be a loss as well as sixteen halfpenny fares if the running costs per car mile exceeded 8*d.*, whereas eighteen halfpenny fares per car mile might yield a profit if the cost per car mile were only 8½*d.* Halfpenny fares totalled 2,288,000 from April to September, or 66,000 more than for the corresponding period of last year, and the takings increased by £550. The receipts were a fraction over 10*d.* per car mile, and 11,624 fewer car miles were run. The cars were run where there was a demand for them, and they worked the undertaking on purely commercial lines. The speaker made no reference to the possibility of the increased traffic being due to war conditions.

After hearing the observations of their engineer and manager "on the present attitude of the London County Council on the question," East Ham Tramways Committee have deferred consideration of a resolution received in August from Leyton Council in favour of abolishing halfpenny fares and instituting a universal penny fare. East Ham Corporation have approved of the action of their committee.

EDINBURGH TRAMWAY PROPOSALS.

The Corporation have now made public the whole of the report prepared by Messrs. John A. Brodie city engineer of Liverpool, J. B. Hamilton, general manager of Leeds City Tramways, and A. H. Campbell, burgh engineer of Edinburgh. The report extends to fifty-nine pages and deals exhaustively with the question of the future of the Edinburgh tramways. Questions addressed to the experts by the Tramways Committee are dealt with seriatim. The reporters advise that the cable system should not be continued after the expiration of the lease in June, 1919, and that it is practicable to arrange for a system of traction other than the cable to be installed so as to be operated at the end of the present lease. These recommendations, they observe, are necessarily subject to war conditions. The only alternative system in their opinion is the electric overhead system. As regards the central part of the city, while they consider that temporarily it must be equipped on the overhead system, the conduit system might be subsequently constructed. The influence of the motor omnibus traffic upon the future street transit of the city they advise should be considered by the committee, with a view to co-ordination and the avoidance of waste. Electric energy would preferably be obtained from the Corporation's new power station at Portobello. Special treatment of the equipment in Princes Street is suggested, and it is thought that by removing the tramways to the south side and placing the tramway standards among trees the detrimental effect of the overhead wires would be greatly minimised. The actual net charge to be carried forward to the new system of traction owing to the abolition of the cable system would be approximately £200,000. The reporters say that, compared with the debt assumed by other tramway undertakings as the price of municipalisation, this amount is small and need create no uneasy feeling considering the capabilities of the new system to bear it.

The whole tramway position in Edinburgh is, of course, dependent upon war conditions, and it seems to be unlikely that the recommendations as to electrification will be acted upon at present. As indicated in a recent issue, the probability is that the cable lines will continue to be used until after the expiration of the existing lease.

IMPORTS OF INSULATING MATERIALS.

The B.E.A.M.A. announces that the Department of Import Restrictions (Board of Trade) has granted to the Association a special licence to import insulating materials in certain classes, which are included in the list of prohibited imports. Electrical manufacturers, whether members of the Association or not, can avail themselves of this licence by making application to the Secretary of the Association.

The Department of Import Restrictions desires it to be known that the granting of licence is a temporary measure to meet present urgent needs. This licence extends to January 16, 1917, at which time the necessities of the situation will be again reviewed. It is expected that firms in the meantime will make every effort to obtain in this country the supplies of insulating material which they require.

MISCELLANEOUS NEWS AND NOTES.

Colchester Corporation Tramways Undertaking has been placed on the list of certified undertakings under the Munitions of War Act.

Reduced Fares for Volunteers.—Members of Volunteer Training Corps are now allowed to travel at half fares on the Tyneside tramways when journeying on the business of the corps.

Shelters for Sheffield Passengers.—The Tramways Committee have asked the city architect and the general manager to prepare plans and estimates for passenger shelters at Firth Park and Lodge Moor termini.

Increased Charges for Parcels. Bradford Tramways Committee have increased the charges for ordinary parcels, and for all contract parcels (other than those carried for Corporation departments) by 25 per cent.

Accident to a Conductor.—While a conductor was changing the trolley arm of a car at a Rochdale terminus the car began to move and he was thrown violently on to his head, sustaining concussion of the brain.

Reward for a Leeds Motorman.—On the recommendation of the general manager, Leeds Tramways Committee have awarded the sum of £5 to Motorman S. Clayton for holding up with his car another car that had run backwards on Beeston Hill.

Extension of Keighley Railless Trolley Routes.—Keighley Tramways Committee are in communication with the county authority on the question of extending the railless trolley service to Oxenhope, for which work the borough council possess powers.

Belfast Conductor Fined. Steps are being taken to deal with the expectoration nuisance on the Belfast cars. One man who was fined 5*s.* and 12*s.* 6*d.* costs by the magistrates, was stated to be a tramway employee, who had been cautioned on the preceding day.

Corrugation at Southend.—In order to cope with the development of corrugation, the tramways engineer has been authorised to make arrangements for the use of a machine during the slack period of the day, as the lighting restrictions prevent it being operated at night.

Energy for Swansea Tramways. On and after November 5 Swansea Corporation will supply electrical energy to all the tramways and light railways worked by Swansea Tramways Company. Application has been made to the Local Government Board to sanction expenditure for extensions of plant.

Melbourne Suburban Railways Electrification.—As the result of a visit of a representative of the Victorian Railway Commissioners to London the Ministry of Munitions have enabled arrangements to be made to accelerate the delivery of electrical plant. It is hoped that the Sandringham-Essendon service will be opened in January, 1918.

Car Maintenance at Southend. Mr. R. Birkett, tramways manager and electrical engineer, has reported upon the difficulties experienced in maintaining the cars owing to the restrictions placed on manufacturers engaged on war work. In the event of alterations that have been made to the trucks of certain cars not proving satisfactory, prices will be obtained for three new trucks, to be delivered next spring.

Sub-Station Training for Discharged Soldiers.—Of forty men already admitted to the free course of preliminary training in sub-station work at the Polytechnic Institute, Clerkenwell, E.C., 25 have been placed in electricity undertakings. To render the training more complete, it is partly given at various sub-stations and generating stations in the London district. A third batch of 20 men began to undergo instruction on October 16.

Re-employment of Disabled Men.—A conference of chairmen of principal employing committees of Sheffield Corporation and their officials has drawn certain recommendations as to the terms on which the Council should re-engage employees disabled in the war. Before finally adopting the draft it was decided to consult representatives of the Municipal Officers' Guild, National Amalgamated Union of Labour, Amalgamated Union of Tramway Workers, etc.

Queues to be Formed.—It was announced at the last meeting of Huddersfield Corporation, by Councillor E. H. Sellers, chairman of the Tramways Committee, that the department were going to try to adopt the queue system in the hope of doing away with the crowding in boarding cars. A similar resolve has been arrived at by Halifax Tramways management. In that town the reduction in the number of cars running has accentuated the crushing.

Employees' Wages. Aberdeen Corporation have approved of the Tramways Committee's recommendation of an increase of ½*d.* per hour to motormen, conductors (males), and cleaners. The employees had asked for 1*d.* per hour; the additional cost at the lower rate is estimated to amount to about £830 per annum. Bolton Tramways Committee have informed their employees' union that they cannot accede to an application for an advance of ½*d.* per hour.

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Fines for Obstructing Tramcars.—For driving a horse and lorry for about 100 yards on the tramway in George Street, Aberdeen, when there was nothing to prevent him leaving the rails, a carter was fined 5s. or five days' imprisonment. The charge was brought under a by-law that requires slow-going traffic to keep as near as practicable to the kerb. At Belfast a horse driver was fined 2s. 6d. and 12s. 6d. costs on a charge of obstructing a tramcar in Shore Road. A road engine-driver at Ystrad was fined 20s. for delaying a tramcar for eleven minutes.

Driving into Car Passengers.—A fine of £10, with the alternative of 21 days' imprisonment, was imposed at Glasgow Sheriff Court on a motor-car driver, 17 years of age, who was charged with running down a young woman with a motor car on Sunday, May 21, in Church Street, Shettleston. The complainer had alighted from a car and proceeded round the back of it to cross the street. The motor car ran her down, and she sustained severe injuries, necessitating treatment in an infirmary for nine weeks. The Sheriff said it was a very serious case, as the youth deliberately broke the by-laws by driving among passengers alighting from a car.

The British Electrical Federation, in the tenth issue of the Record of the Operations of the Mutual Aid Fund, covering the period to October 11, 1916, reports that the number of employees who have enlisted, excluding those who have been discharged for medical reasons, is 1,951, while the total number of employees at the end of July was 7,432. At present the dependents of 663 employees are receiving grants, and the total grants to the end of October amounted to £18,095. £12,138 has been contributed by the companies included in the Federation, and £8,893 by the employees. The Roll of Honour contains the names of 78 employees who have been killed in action.

Precautions During Restricted Lighting.—In the "Hull Daily Mail" of October 23 appears a report of an interview with Mr. W. J. McCombe, manager of the tramways, on the subject of public safety during the dark nights. The report extends to half a column, and Mr. McCombe's remarks are worthy of perusal by managers elsewhere. Two pedestrians were knocked down by Bradford cars on the night of October 22, one being killed. In connection with a similar fatality at Oldham, Mr. P. Priestly has reported to the Tramways Committee that he has instructed motormen, who under the present conditions can only see two yards ahead, to use every care, but it is necessary for pedestrians to be very careful.

A Kirkcaldy Tramway Agreement.—When the Kirkcaldy Corporation tramways were extended to Dysart, the Town Council of the latter place agreed to pay Kirkcaldy £150 per annum for ten years, subject to readjustment at the end of five years if the extension proved profitable. The five years have expired, but Mr. Anderson, who was appointed to act for Dysart, has reported that as the figures have not been kept separately it is impossible to state definitely whether the tramway had been run at a profit or not. Dysart Council have asked Kirkcaldy to modify the payment from £150 to £75, and if the proposal is not accepted, the Secretary for Scotland is to be asked to declare the agreement null and void.

Melbourne Council Ask for Conduit Traction.—A resolution has been passed by the City Council of Melbourne asking the Government if it is decided to electrify the cable tramways, to provide for placing the electrical equipment underground. A recommendation to that effect was made to the Corporation by their Public Works Committee, and the Lord Mayor stated that any scheme for the overhead system would be strongly opposed. In the Bill about to be introduced by the Government for the control of the tramways in and near Melbourne, provision is made for compensating the Railway Commissioners for the loss of revenue anticipated on the suburban railways after the electrification of and linking up of the various tramways.

Metropolitan Association of Tramways Managers.—A meeting of the members of this Association was held at the Municipal and County Club, Whitehall Court, Whitehall, S.W., on October 20, when there were present Messrs. W. C. Ullmann (East Ham), F. Schofield (Leyton), L. E. Harvey (Ilford), J. C. Williams (Erith), W. E. Hammond (Metropolitan), J. Mackinnon (London United), A. V. Mason (South Metropolitan), L. Slattery (West Ham) and T. B. Goodyer (Croydon). Mr. Ullmann was re-elected chairman, Mr. Hammond was elected vice-chairman, and Mr. T. B. Goodyer was re-elected hon. secretary. Letters of inability to attend were received from Mr. J. K. Bruce (London County Council), Mr. W. Murray (Walthamstow) and Mr. H. P. Stokes (Bexley). Various matters of interest were discussed.

For and Against Discount Tickets.—To a suggestion that discount tickets should be issued on the Brighton Tramways, Mr. W. Marsh, the general manager, has pointed out that such tickets constitute a temptation to conductors. Books of tickets are issued, however, by the Brighton and Hove Omnibus Company at the rate of 60 penny tickets for 4s. 6d., or 60 twopenny tickets for 9s. While admitting that it is possible for the tickets to be put to fraudulent use, the company do not believe that the device is put into practice, as it would necessitate collusion, on anything but the smallest scale, while the risk of detection would be very great. One advantage of discount tickets to the company is that business firms purchase them for their employees. In some towns this use of the tramways is encouraged by the issue of tokens, which are obtained in quantities at full price. If discount tickets were granted at Brighton there would be an agitation for its extension to all classes of passengers, and it is a question whether the undertaking can afford any cheapening of its facilities. It suffers from the disadvantage of not possessing a route through the central business thoroughfares, owing to their narrowness. The motor omnibuses, however, are allowed to use those streets, and the Corporation had arranged for a railless trolley installation to take their place, but owing to the war the carrying out of the scheme has been deferred.

The British Electrical and Allied Manufacturers' Association.—The B.E.A.M.A. announces that the following firms have been elected members of the Association :—

Ashton Frost & Co., Ltd.	Blackburn
Bever, Darling & Co., Ltd.	Bradford
Buckley & Taylor, Ltd.	Oldham
Clayton, Goodfellow & Co., Ltd.	Blackburn
Davy Bros., Ltd	Sheffield
Fullerton, Hodgart & Barclay, Ltd. ...	Paisley
Gilloways, Ltd.	Manchester
Glenneld & Kennedy, Ltd.	Kilmarnock
Lilleshall Co., Ltd.	Salop
Marsdens' Engines, Ltd.	Heckmondwike
Newton, Bean & Mitchell	Bradford
Pollit & Wigzell, Ltd.	Sowerby Bridge
Robey & Co., Ltd.	Lincoln
Scott & Hodgson, Ltd.	Manchester
S. S. Scott & Co.	Haslingden
Simplex Conduits, Ltd.	Birmingham
Tyer & Co., Ltd.	London
Woodhouse & Mitchell, Ltd.	Brighouse
Yates & Thom, Ltd.	Blackburn

The Arrest of Hull Motormen.—The Hull magistrates on October 18 investigated charges against two motormen of being absentees from the Army. In one case Lieutenant Runton stated that the man was exempted by the local tribunal from combatant service only. The appeal tribunal dismissed his appeal and refused leave to appeal to the central tribunal. The man then became an absentee. Tramwaymen were not in a reserved occupation, unless claimed for by the Corporation as indispensable. Defendant gave evidence that a notice was posted in all the depots stating that motormen who were called up need not report until they received further instructions. Motormen had been called up, but they had not joined the colours and were still at work. He received an exemption certificate signed by the manager, and took it to the city hall, together with his calling-up notice. The lady clerk kept the notice and certificate and told him he was all right. Mr. W. J. McCombe, the manager, said he had had various communications with the military with respect to the position of motormen, and as a result he wrote informing motormen that if called up they need not report until they received further instructions. He had also issued certificates as to their occupation. The Tramways Committee had not applied for the exemption of any of their employees. Believing that defendant was misled by the notice put up in the depots, the justices said they would not inflict a penalty, but defendant must be handed over to the military. In the other case the defendant said he took his calling-up notice and the certificate from the manager to the city hall and handed them to a lady clerk. After taking the papers into a private office the clerk said that his exemption certificate would be forwarded in a few days. This defendant was also handed over to the escort, the chairman observing that the women clerks ought to be told that they had no authority to deal with such matters.

Damages Against London County Council.—An action was heard at Woolwich County Court, on October 18, in which a tramcar passenger sued the London County Council and Eaton and Co., Ltd., the owners of a horse and van, for £50 damages for injuries received in a collision between a tramcar and the other defendants' van. The driver of the van said his off-side wheel was caught in a depression by the side of the rail, and before he could get clear the car collided with the van. He alleged that the motorman could see that the wheel was caught. Plaintiff stated that the collision threw her to the floor of the car, injuring her right arm and cutting and spoiling her dress. For ten weeks she was attended by a doctor and had to employ a woman to do her household work. The doctor certified that plaintiff's shoulder and arm were badly contused, that she suffered from nervous shock and was unable to attend to her duties. A surveyor gave evidence that he found the lines projecting to the extent of one and one-eighth to three-quarters of an inch, and that later on repairs were effected. For the County Council, Mr. J. R. Wignall, C.E., said the worst instance of wear in the track was from one-eighth to five-sixteenths of an inch on the near rail and on the off rail from one-fourth to seven-sixteenths of an inch. That wear was not abnormal, and he gave no instructions for repair. It was difficult now to obtain sufficient labour to keep the track in perfect order. The track at this spot had since been attended to because of a doubling carried out at the request of the Ministry of Munitions. Cross-examined, he admitted that wear to the extent of one and one-eighth inches would be dangerous. The rail did not project to a sufficient extent to cause a heavy cart to skid. The motorman and conductor attributed the collision to a glass carrier projecting over the van, and the former said he did not observe that the driver was in difficulties. The jury found a verdict for £30 against the County Council only.

Plymouth Through Running and Universal Penny Fare.—The inauguration of the linking up of the late Devonport Tramways Company's lines with those of Plymouth Corporation and the universal penny fare on all sections took place on October 23. Three days before that event the Mayor and Corporation made a tour of the tramways in four decorated cars, and at the Peverell terminus the leading car severed a barrier of artificial flowers that divided the two sections, after which Alderman W. Blackall, deputy mayor, expressed satisfaction at the inauguration of through running and of the universal penny fare. The dual innovation would, he said, be of especial benefit to the dockyard men, who lived at one end of the town and worked at the other end, and the ratepayers would realise that the tramways constituted their most valuable asset. At the subsequent luncheon the Mayor (Alderman T. Baker) said it was not yet possible to link up with the other tramways company, which served Plymouth, Stonehouse, and Devonport, but they could prepare for the time when that company's lease expired in 1922, though he hoped an arrangement would be made long before then. Councillor J. P. Goldsmith, the mayor-designate, observed that the improved facilities would, after the war, lead

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to the solution of the housing congestion by opening up four outlying districts. An indication of the outlook for through running and the universal penny fare, adopted on the recommendation of Mr. C. Everson, the general manager, was given by Alderman S. H. Phillips, chairman of the Tramways Committee. He stated that hitherto in both areas from 80 to 90 per cent of the fares were for a penny, and he believed that the increased traffic would make good the balance. Since taking over the Devonport and District Tramways they had reduced some of the fares and extended the distances. For the year ended December 31, 1914, the company carried 6,694,154 passengers, and the receipts were £33,039. The Corporation figures on the same section for the year ended October 1, 1916, were 8,932,288 passengers and £39,430 receipts. For the nine months to October 1, 1916, the receipts were £30,500, as against £28,850 earned by the company for the nine months, to October 1, 1915.

PERSONAL.

Captain S. W. Carty, of the Army Service Corps, and late of the electrical department of Liverpool Corporation Tramways, is one of the officers mentioned in the despatch of General Sir Reginald Wingate (Sirdar and Governor-General of the Soudan) for their work in the operations in Darfur. Captain Carty was in charge of the motor transport supply column.

Mr. A. W. Tait, a member of the committee appointed by the Board of Trade to inquire as to the measures to be taken to safeguard the metal trades after the war, is chairman of the British Aluminium Company, Ferranti, Ltd., Llandudno and Colwyn Bay Electric Railway, Delhi Electric Tramways and Lighting Company, Fraser and Chalmers, the Russian Corporation, and the Metropolitan Electric Supply Company. He is also a director of Barbados Electric Supply Corporation, Bruce Peebles and Co., and Falkirk and District Tramways Company.

Sir Joseph Beecham, Bart., who died suddenly on October 23, was an alderman of St. Helens Corporation, chairman of their Electricity and Tramways Committees, and a director of the Lancashire Light Railways, Lancashire United Tramways, South Lancashire Tramways and West Cumberland Electric Tramways Companies.

CONTRACTS AND ORDERS.

Siemens Bros.' Dynamo Works have an order from Paisley Council for a high-tension switchboard.

Croydon Council have purchased a high-tension feeder cable from Callender's Cable and Construction Co., Ltd.

British Westinghouse Company are supplying a 500-kw. rotary converter with transformer, etc., to Wednesbury Council.

Messrs. Edgar Allen and Co., Ltd., have received an order from Glasgow Tramways Committee for the supply of special track work.

Sunderland Council have accepted the tender of Everett Edgcumbe & Co. for surge arresters, and of W. T. Henley's Telegraph Works, Ltd., for cable.

Rotherham Tramways Committee have purchased 60 motormen's oilskins at 27*s.* each and 60 conductors' mackintoshes at £1 11*s.* 6*d.* each from Tasker, Son and Co.

Blackpool Jacks.—The Equipment and Engineering Co., Ltd., have received an order from Blackpool Corporation for a large number of jacks for use on the tramcars. It is intended that a jack shall be carried on each car.

Plymouth Tramways Committee have ordered eight trucks and car bodies from the Brush Electrical Engineering Company at £545, and electrical equipment at £431 per car for eight cars from the British Westinghouse Company.

FINANCIAL REPORTS AND MEETINGS.

Brazilian Traction, Light, and Power Company.—The directors announce a dividend of 1 per cent. on the ordinary stock.

United Electric Tramways of Caracas.—A dividend of 7 per cent. less tax, for the past year is recommended by the board, carrying forward £2,428.

City of Buenos Ayres Tramways Company.—The board announce a dividend of 1*s.* 3*d.* per share (5 per cent. per annum) for the three months ended September 30.

Hurst, Nelson & Co.—The directors recommend a dividend of 10 per cent., together with a 2½ per cent. bonus, both free of tax. The profits were £73,426, to which has to be added £15,000 brought forward.

Bahia Tramways, Light and Power Company.—The trustees of this company have presented a report to the bondholders on the present position owing to the Municipal Council having repudiated their contract to purchase the undertaking. Sir Wm. Plender, who presided at the meeting, said that matters were now at a deadlock, for though the courts had recognised the rights of the company there seemed to be no way of effectively enforcing those rights. The Council had behaved in a manner that was a disgrace to a civilised community.

Trafford Park Estates, Ltd.—The report for the year ended June 30, 1916, to be submitted at the general meeting on November 2, states that the capital expenditure, mainly on new buildings, during the year has amounted to £128,582. About fifty acres of land adjoining the estate had been acquired by the company and the profits amount to £30,172. With the balance of £45,070 brought forward from last year there is an available sum of £75,242. The payment of a dividend at the rate of 4 per cent. on the ordinary shares is recommended. This will require £24,890, leaving a balance of £50,352 to be carried forward.

Norwich Tramways Company.—The directors recommend a dividend of 3 per cent. for the past year: the allocation to the reserve is to be increased from £2,500 to £5,000, and £1,000 is to go to the 1914 account. The carry-forward will be reduced by £600 to £429.

Record Nine Months at Liverpool.—In responding to a vote of thanks accorded him at the final meeting of Liverpool Tramways Committee for the municipal year, Mr. Russell Taylor, the chairman, said that the past nine months had been a record for the tramways as regarded the receipts and the number of passengers. The increase in the receipts had been £27,547, and in passengers 4,451,477. The mileage had decreased by 56,044, and the earnings per car mile had increased .70*d.* That statement would convey something of the great carrying capacity of the cars. The department had been handicapped owing to the war in many directions. The greater part of the staff had joined the army, and the manager had had to supplant them by inexperienced men and women, who were doing the work fairly satisfactorily. At the end of the year the balance sheet might not be as satisfactory as some of them would like it to be, as they had considerable additional expense owing to army allowances and war bonuses, and increased outlays in other directions. The reduced lighting of the cars had been responsible for some inconvenience to passengers, and owing to the shortage of labour the service was not kept up as efficiently as the manager would like. He had to ask the public still to endure the inconvenience, as they had no alternative.

DICK, KERR & CO., LTD.

Mr. Claud T. Cayley presided over the ordinary general meeting of the shareholders of this company held on Thursday at the Cannon Street Hotel. The Secretary (Mr. E. D. Johnson) having read the notice convening the meeting and the auditors' certificate, the chairman moved the adoption of the report and statement of accounts, with confirmation of the 6 per cent. dividend on the preference shares and the 6 per cent. dividend on the ordinary shares. He said the past year had been a strenuous one for everybody connected with the company. The work actually undertaken had been of greater magnitude than the directors had anticipated a year ago. Both the manufacturing department and the contracts department were doing a larger turnover than ever, and this was greatly to the credit of the staff, in view of depletions owing to members having joined the Forces. The profit, with the £18,346 brought forward, gave £79,296 for appropriation, out of which £25,000 was set to "Special Reserve for Contingencies," bringing the fund up to £50,000. Their present work was largely abnormal, and a transition period was bound to come. It was therefore sound policy to build up a reserve to help them over that period. He explained the acquisition of a controlling interest in Messrs. Willans & Robinson, which would lead to closer combination of working interests and mutual benefit. It had been a great satisfaction to the Board to see the mobile way in which the staff had thrown themselves into the work of reorganisation to meet an entirely new class of manufacture, and had achieved no little success in adverse conditions. Much to-day was said about slackness, but he was pleased to say that at the Preston works the time lost from all causes, including illness, was during the year only 1.4 per cent. He thought that with such a staff, given reasonable protection of a permanent nature against unfair competition from outside the Empire, there was every reason to look forward to the future with confidence. Mr. Prestwich seconded the motion, which was unanimously agreed to, after several shareholders had congratulated the Board on the success of the operations during the year and the restoration of the company to the list of dividend paying concerns. The retiring directors, Messrs. Prestwich and Lingard, were re-elected, as also the auditors, Messrs. Gane, Jackson, Jefferys and Freeman, and votes of thanks to the Managing Director (Mr. W. Rutherford), the staff and the Board of Directors, closed the meeting.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-four of the principal tramway undertakings in the United Kingdom for the week ended October 14 give total receipts of £186,903, or £12,622 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or sixty-six more than for the corresponding week. The receipts this year were at the rate of £83 17*s.* per mile of single track, and last year at the rate of £80 12*s.* 3*d.*, thus showing an increase for the week of £3 4*s.* 9*d.* per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. Oct. 26.	A Week Ago.
5%	5%	Alabama Traction. 5% 1st. Mt.	—	67	70½	70½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	65/-	65/-
4%	4%	Do. 4% Deb. ...	100	91	68½	69
4½%	4½%	Do. 4½% Deb. ...	100	98½	74	74
5%	5%	Do. 5% Deb. ...	100	96	69	70½
1/-	7d	Auckland Elec. Trams. Ord. ...	1	1⅝	21/-	21/-
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	94½	93⅝
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅛	10⅜	10⅜
4½%	4½%	Do. 4½% Deb....	100	96	83	83
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	91½	91½
$1	$1	Brazilian Trac. & Power Ord. ...	$100	66	54⅛	58⅝
$1¼	$1¼	Do. 6% Cum. Pref.	$100	97	91½	92½
4/-	4/-	Brisbane Elec. Trams. Old. ...	5	7½	7	7
2/6	2/6	Do. 5% Cum. Pref.	5	5	85/-	85/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	58⅝	58⅝
6%	5%	Do. Pref. Ord....	100	106	56½	56½
5%	5%	Do. 5% Cum. Pref.	100	103	70	72½
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	86¾xd	88¾xd
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	66½	67½
—	£3*	Brit. Elec. Trac. Ord.	100	—	35½	35
—	6%	Do. 6% Cum. Part Pref. ...	100	—	77	78
5%	5%	Do. 5% Deb.	100	92	83½	83½
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	71	71
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	81½	81½
3/-	6/6	Calcutta Tramways, Ord. ...	5	7½	7⅜	6½
1/3	1/3	City of B.A. Trams.	5	5½	85/-	90/-
5/-	4/-	Dublin United Trys 6% Pref.	10	12	11	11
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79⅜	79⅜
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	27/6	27/6
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	1	2/1½	2/1½
6/-	6/6	Lanarkshire Trys. Co.	10	10½	9⅝	9⅝
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9½d.	9½d.*	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	1⅝	2/4½	2/4½
6d.	6d.	Do. 5% Pref.	1	1/16	8/-	8/6
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	64½	63½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	89½	89½
5%	5%	Do. 5% Inc. Deb.	100	88½	81	81
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	47⅞	47½
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	96/6	96/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	66⅔	66⅔
$1¼	$1¼	Manila Elec. R. R. & Light ...	$100	102	68	66½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	75⅜	78
$1¼	$1¼	Mexico Trams. Common ...	$100	70	31⅝	32½
5%	5%	Do. 1 Mt. 5% G.B.	—	84	43⅜	43⅜
6%	6%	Do. 6% Mt. Bds.	100	76	33⅜	34
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	94½	94½
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95	95
1/-*	1/2½*	National Steam Car	1	⅝	20/6	20/1½
9½d.*	9½d.*	New General Traction	1	1	7/9½	7/9½
8½d.	6d.	Northern Gen. Trans. Ord. ...	1	8/16	15/4½	15/4½
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	70/-	70/-
5%	5%	Do. 5% 1st Deb.	100	89½	74½	74½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80⅜	80⅜
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	12/16	11/-	11/3
8d.	8d.	Provincial Trams. Ord.	1	⅞	17/-	17/-
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84/-	84/-
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	91½	91½
5%	5%	1st. Mt. 5% 50 yr.	100	89½	74½	75
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	90	90
5%	5%	Do. 5% Perp. Deb.	100	99½	77½	81½
—	—	Singapore Elec. Trams	5/-	¼	4/10½	4/10½
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	96½	96½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	82½xd	82½xd
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	95	95
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	77	77
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	9/3	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4⅞	99/6	99/6
—	—	Metropolitan Dist. Ord. ...	100	21⅜	16	16½
—	—	Undgd. Elec. Rys. of London ...	10	2½	36/-	36/10½
		Do. "A"	1/-	⅜	5/3	5/3
4½	4½	Do. 4½% Bds of 1933 Rd.	—	99	101½	101½
6	6	Do. 6% 1st Cum. In. Db.	100	114	102	105⅜
6	6	Do. 6% In. Bonds Rd. ...	—	88	88⅞	89

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1915	Latest Return. 1916	Aggregate. Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	Oct. 21	£50,754	£53,160	43	£2,138,409	+ £343
Auckland (28 days)	Aug. 25	19,876	20,469	8	41,974	— 55
Ballarat and Bendigo ...	Aug. 13	2,860	2,791	20	15,870	+ 836
Brazilian Traction Mlrs.	Aug.	6,576 000	7,184,000	35	54,329,000	+3,365,890
Brisbane	Sept.	30,360	32,530	39	297,660	+ 22,586
British Columbia $	Aug.	507,126	550,293	9	1,088,586	+ 70,737
Buenos Aires Lacroze ...	Sept. 3	39,355	37,075	13	111,945	+ 10,338
Burmah Tramway ... Rs.	Sept.	22,163	23,749	9	48,161	— 839
Calcutta Rs.	Oct. 21	66,319	65,596	43	2,858,015	+ 129,811
Cape Town	Aug.	...	13,394	...	...	...
Carthagena & Herrerias..	Sept.	1,252	1,779	39	22,600	+ 7,020
Cordoba	Aug.	14,159	13,852	22	71,165	+ 469
East India	Sept.	2,054	2,523	9	5,045	+ 725
Hong Kong $	Sept. 16	11,424	16,525	40	541,227	+ 134,531
Kalgoorlie	Aug.	3,165	3,021	35	20,479	— 1,640
La Plata	Sept.	3,894	3,994	39	37,622	— 257
Lima	Sept.	30,530	33,348	39	304,058	+ 15,777
Lisbon Escu.	Aug.	...	203,703	...	...	...
Madras (2 weeks)	Oct. 15	29,529	32,305	41	602,091	+ 44,501
Manila	July	23,750	33,700	31	887,739	+ 39,986
Manaos Rs.	Aug.	...	147,774	...	...	...
Melbourne	May	...	69,275	...	...	...
Montevideo	Sept.	25,070	26,711	48	319,043	+ 15,626
Pernambuco	Oct. 22	3,078	3,216	42¾	127,369	— 2,016
Peruvian $	Sept.	755,280	911,910	13	2,643,240	+ 344,083
Port Elizabeth	Aug.	...	2,863	...	...	...
Rangoon	Sept.	4,445	4,137	39	41,328	— 2,001
Shanghai $	Oct. 13	28,298	33,337	...	...	...
Singapore $	Sept. 9	12,327	13,313	36	451,406	+ 46,879
Toronto $	Aug.	762,627	889,241	35	7,092,229	+ 746,526
Winnipeg	Aug.	251,189	249,795	35	2,193,957	— 57,510

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	Latest Return. 1916	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Aggregate. Incr. or Dec.
Aberdare U.D.C.	Oct. 17	£373	£394	+ 21	29	£11,469	+ £1,292
Aberdeen Corporation...	,, 18	1,674	1,768	+ 94	20	39,518	+ 2,201
Accrington Corp.	,, 18	545	571	+ 26	29	17,173	+ 636
Ayr Corporation	,, 21	254	283	+ 28	23	11,626	+ 989
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	,, 22	1,282	1,585	+ 303	29½	45,760	+ 4,529
Birmingham Corp.	,, 21	15,185	14,766	— 419	29	480,859	+ 66,610
Do. Motor Omnibuses	,, 21	786	991	+ 205	29	29,348	+ 3,732
Blackburn Corp.	,, 18	1,173	1,157	— 16	29⅔	38,607	— 1,124
Blackpool & Fleetwood.	,, 21	393	442	+ 49	42	40,768	+ 4,830
Blackpool Corp.	*	...	...	...	...	...	...
Bolton Corporation	,, 22	2,580	2,892	+ 312	30	87,146	+ 6,110
Bournemouth Corp.	,, 25	1,723	2,032	+ 309	30	73,244	+ 5,221
Bradford Corporation ...	,, 21	6,149	6,587	+ 438	29	204,579	+ 7,275
Brighton Corporation ...	,, 22	956	1,154	+ 198	29⅔	40,014	+ 4,085
Bristol	,, 20	9,483	10,358	+ 875	42	425,467	+ 21,807
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation	,, 21	1,553	1,707	+ 154	30	52,135	+ 2,949
Burton-on-Trent Corp...	,, 22	263	278	+ 15	29	8,219	— 529
Bury Corporation	,, 22	1,256	1,372	+ 116	30⅔	43,738	+ 2,102
Cardiff Corporation	Sept. 30	2,717	3,151	+ 434	26	80,293	+ 6,685
Chatham & District	Oct. 19	1,147	1,316	+ 169	42	52,197	+ 2,488
Chesterfield Corp.	,, 12	275	281	+ 6	28	8,070	+ 304
Colne Corporation	,, 4	258	259	+ 1	...	...	...
Cork Electric	,, 19	500	544	+ 44	42	21,685	+ 282
Croydon Corporation ...	*	...	...	...	...	...	...
Derby Corporation	,, 21	992	1,148	+ 155	29½	34,028	+ 2,398
Dover Corporation	*	...	...	...	...	...	...
Dublin & Lucan	,, 20	136	143	+ 7	16	2,920	+ 223
Dublin United	,, 20	6,062	6,341	+ 279	42	256,127	— 1,216
Dundee City	,, 18	1,345	1,347	+ 2	22⅔	31,813	+ 752
East Ham Corporation	,, 21	1,277	1,288	+ 11	29½	39,146	+ 196
Exeter Corporation	,, 20	347	394	+ 47	29	12,147	+ 457
Glasgow Corporation	,, 21	21,965	24,246	+ 2,281	20⅔	481,573	+ 34,098
Glasgow Subway	,, 21	1,096	1,224	+ 128	42	47,958	+ 4,224
Glossop (U. Elec. Supp.)	,, 21	128	140	+ 12	43	5,995	+ 588
Halifax Corporation	,, 17	2,132	2,098	— 34	28⅓	67,308	+ 926
Do. Motor Omnibuses	,, 17	47	51	+ 4	28½	1,457	— 52
Hastings & District	,, 20	874	936	+ 62	42	45,286	+ 2,873
Huddersfield Corp.	,, 21	2,512	2,776	+ 264	29	85,008	+ 7,453
Hull Corporation	,, 21	3,042	3,139	+ 97	29	91,645	+ 1,468
Ilford U.D.C.	,, 14	608	677	+ 69	28	19,896	+ 1,036
Ilkeston Corporation ...	*	...	...	...	...	...	...
Ipswich Corporation	,, 21	506	435	— 71	29	16,045	— 849
Isle of Thanet	,, 21	287	292	+ 5	3	966	— 106
Kilmarnock Corp.	,, 21	166	176	+ 10	22⅔	4,076	+ 64
Lanarkshire	,, 19	2,318	2,289	— 29	42	97,467	+ 14,144
Lancashire United	,, 18	1,718	1,850	+ 132	42	77,398	+ 3,815
Leeds City	,, 21	8,666	9,692	+ 1,026	30	292,481	+ 26,259
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	,, 21	741	858	+ 117	22⅔	20,510	+ 2,466
Leyton U.D.C.	,, 12	1,584	1,557	— 27	28	48,425	+ 963
Liverpool Corporation...	,, 14	13,665	14,943	+ 1,278	41½	581,305	+ 29,900
Llandudno & Colwyn B.	,, 13	276	316	+ 40	45½	17,218	+ 1,055
London County Council	,, 4	45,729	50,215	+ 4,486	26½	1,309,893	+ 134,937
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation..	*	...	...	...	...	...	...
Maidstone Corporation..	,, 19	215	216	+ 1	29	6,625	— 172
Manchester Corp.	,, 21	17,879	18,648	+ 769	28	558,205	+ 29,712
Met. Elec. Trys.	*	...	...	...	...	...	...
National Steam Car....	*	...	...	...	...	...	...
Nelson Corporation	,, 21	179	197	+ 18	29½	6,395	+ 494
N'castle-on-Tyne Corp.	,, 21	6,364	7,017	+ 653	29	196,466	+ 9,625
Newport (Mon.) Corp....	,, 21	795	950	+ 155	29	28,275	+ 3,012
New St. Helens & Dist.	,, 18	953	1,041	+ 88	16	19,258	+ 1,199
Northampton Corp.	,, 20	659	723	+ 64	29	20,963	— 1,229
Nottingham Corp.	,, 19	3,689	4,041	+ 352	29	115,568	+ 4,702
Oldham Corporation ...	,, 22	2,240	2,382	+ 142	30	76,493	+ 4,463
Portsmouth Corp.	,, 21	2,220	2,526	+ 306	...	...	...
Preston Corporation	,, 18	956	1,184	+ 228	28⅔	32,329	+ 3,903
Provincial	,, 21	2,105	2,251	+ 146	3	6,905	+ 265
Reading Corporation	,, 19	739	891	+ 152	28⅔	25,350	+ 1,847
Rhondda Tramways	,, 19	1,256	1,363	+ 107	42	54,162	+ 4,636
Rochdale Corporation...	,, 21	1,646	1,715	+ 69	29½	54,238	+ 2,160
Rotherham Corp.	,, 25	1,176	1,618	+ 442	29⅔	46,549	+ 11,721
Salford Corporation	,, 23	5,048	5,421	+ 373	28⅔	164,865	+ 8,453
Sheffield Corporation.	,, 22	9,099	10,656	+ 1,557	30½	318,979	+ 49,703
Southampton Corp.	,, 18	1,469	1,726	+ 257	28⅔	49,302	+ 4,374
Southend-on-Sea Corp...	,, 18	670	786	+ 116	29	30,233	+ 3,478
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	,, 21	761	829	+ 63	29½	25,043	+ 1,146
Sunderland Corp.	,, 22	1,426	1,630	+ 204	29	48,852	+ 3,681
Sunderland District...	,, 18	585	726	+ 141	50	31,724	+ 2,178
Swindon Corporation ...	,, 18	191	205	+ 14	28⅔	6,056	+ 156
Torquay Tramways.....	,, 19	506	544	+ 38	42	25,830	+ 1,975
Tyneside Trys. & Tmrds.	,, 18	574	633	+ 59	16	11,247	+ 836
Wallasey Corporation ...	,, 21	1,118	1,243	+ 125	29½	42,309	+ 2,510
Walsall Corporation.....	,, 21	774	823	+ 49	43	34,778	+ 3,254
Walthamstow U.D.C....	,, 21	771	1,021	+ 250	29	33,543	+ 5,456
Warrington Corp.	Sept. 28	466	535	+ 69	26	12,887	+ 1,014
West Ham Corporation	Oct. 19	2,964	3,271	+ 307	28⅔	95,589	+ 3,799
Wigan Corporation	,, 19	1,586	1,734	+ 148	29	49,217	+ 4,165
Yorkshire (W. Riding)...	,, 22	1,436	1,757	+ 321	43	75,910	+ 7,604

* Issue of Traffic Returns suspended during the War.

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(*Issue of September* 14, 1916.)

This is an account of a high-tension direct-current installation of unprecedented magnitude. The railway extends westward across the American prairies, then over the Rocky Mountains and on to the Pacific Coast. The section now electrified stretches for a distance of 440 miles over three successive mountain ranges, and its construction includes some notable features. The article presents a general description of the arrangements for power supply, the overhead construction, and the electric passenger and goods locomotives. Characteristic curves of both types of locomotives are given. Maps, numerous photographic illustrations and drawings serve to convey a realistic idea of the magnitude of the work.

LANCASHIRE & YORKSHIRE ELECTRIFICATION.
MANCHESTER-BURY SECTION—DIRECT CURRENT SYSTEM AT 1,200 VOLTS.
(*January* 13, 1916.)

A detailed description of the equipment of the Manchester-Bury section, the latest enterprise of the Lancashire and Yorkshire Railway in the electrification of their lines. The first section electrified was the Liverpool-Southport line, which was equipped in 1903-4 by Dick, Kerr and Co., Ltd., on the 500 volt direct current system. In the present instance current at 1,200 volts is sent out on the conductor rails, and the train motors are designed for working at this pressure. The description is accompanied by over 50 clear drawings and photographs.

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LONDON AND SOUTH-WESTERN RAILWAY ELECTRIFICATION.
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(*November* 13, 1915.)

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NORTH-EASTERN RAILWAY ELECTRIFICATION.
SHILTON-NEWPORT MINERAL BRANCH.
(*June* 8, 1916.)

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NORFOLK AND WESTERN ELECTRIFICATION.
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By R. BICKERSTAFFE HOLT,
Highways and Permanent Way Engineer, City of Leeds.

CONTENTS.

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"What's wrong with the Track?"

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Road metal—Water-gravel—Sand—Clinker-sand—Trass.

CHAPTER III.—REPAIRS TO CONCRETE FOUNDATIONS.
Patching—Partial repairs—Complete renewal.

CHAPTER IV.—TRACK DESIGN.
"Follow my leader" policy—Importance of local conditions—Effect on sub-soil—Standard methods—Transverse sleeper tracks—Effect of vehicular traffic and tramway car traffic.

CHAPTER V.—RAIL PACKING.
Pitch and tar packing—Materials—Testing and preparation of materials—Prepared tar—Pitch mixtures—Movement of rails—Packing and floating.

CHAPTER VI.—RAIL LAYING.
Bad rail packing—Rails canted or twisted—Anchoring and padding—Rail expansion and contraction—Curving of rails—Springing of rails—Anchoring tracks.

CHAPTER VII.—JOINTS, FISH PLATES, BOLTS AND NUTS.
Why joints fail—Dished or hammered joints—Movement at joints.

CHAPTER VIII.—JOINT WELDING.
Methods of welding—Thermit welding—Electric arc welding process—Expansion and contraction—Oxy-acetylene process.

CHAPTER IX.—RAIL WEAR.
At joints—On new tracks—On steep gradients—On wheel tires—Contact of wheel and tire—Leeds special rail section—Railway rails—Depression of check.

CHAPTER X.—COMPOSITION AND MANUFACTURE OF TRAMWAY RAILS AND RAIL WEAR.
Defective rails—Composition of rails—Standard specification—Basic and acid Bessemer process—Sandberg process—Analysis of rails and rail tests—Drop test unnecessary.

CHAPTER XI.—CORROSION OF TRAMWAY RAILS.
Causes of rail corrosion—Exposure to sea water—Effect of corrosive liquid.

CHAPTER XII.—TRACK PAVING.
Effect of vehicular traffic—Cause of loose rails—Importance of quality in sets—Square-dressed setts—Nidged granite setts—Bonawe granite setts—Wood paving—Bedding of setts—Laying and ramming.

CHAPTER XIII.—RECONSTRUCTION.
Removal of tracks—Temporary tracks.

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Rail cleaning—Rail grinding—Rail planing.

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THE

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."

Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

STALYBRIDGE, HYDE, MOSSLEY AND DUKINFIELD TRAMWAYS AND ELECTRICITY BOARD.

The Generating Station Committee of the above Board are prepared to receive tenders for the supply, delivery and erection of the following plant:—

1. Water-tube boilers.
2. Mechanical stokers.
3. Cooling towers.

Specifications and forms of tender can be obtained at the Generating Station, Stalybridge.

ROBERT BLACKMORE,
Engineer-in-Chief.

Generating Station, Stalybridge.
October 31, 1916.

COUNTY BOROUGH OF ROTHERHAM.

DOUBLE DECK TRAMCARS.

The Tramways Committee of the Rotherham Corporation are prepared to receive tenders for the supply and delivery of six Electric Double-deck, Top-covered Cars.

Full particulars and information can be obtained on application to the General Manager, Mr. E. Cross, Tramways Depot, Rotherham.

The firm whose tender is accepted will be required to enter into a contract which will contain the usual "Fair Contract Clause." Tenders endorsed "New Cars," to be sent to me not later than Thursday, November 16.

CHAS. L. DES FORGES.

October 31, 1916.

COUNTY BOROUGH OF SALFORD.

ELECTRICITY DEPARTMENT.

The Electricity Committee are prepared to receive on or before noon, November 13, 1916, addressed Chairman, Electricity Committee, Frederick Road, Salford, offers of purchase of a quantity of Low Pressure Cast-iron Piping, 15 in., 20 in., 24 in., and 28 in. bore. Full particulars from the Borough Electrical Engineer, Frederick Road, Salford.

L. C. EVANS.

Town Hall, Salford.

POSITIONS VACANT.

RAMSBOTTOM URBAN DISTRICT COUNCIL.

FITTER.

Wanted for duration of war on the above-named Council's Railless Traction System, a competent Fitter with knowledge of Motor-bus and Tramcar Work. Applicants must be ineligible for the army or navy.

Applications to be sent to the undersigned, giving full particulars of previous employment, and stating wages required, not later than Wednesday, November 8, 1916.

JAMES WILD,
Manager.

Tramway Offices,
Stubbins Lane, Ramsbottom.

TEMPORARY CHIEF CLERK.

The Aberdare Urban District Council invite applications for the post of Temporary Chief Clerk (male or female) in their electricity and tramways department. Applicants should have had experience with the forms of account prescribed by the Board of Trade and Municipal Tramways Association and have a good knowledge of central station book-keeping and statistics in all branches, and to be able to supervise office staff. Candidates must be ineligible for military service. Salary at the rate of £140 per annum.

Applications, giving age, experience, and date upon which applicant can commence duties, together with copies of three testimonials, must be delivered to the TOWN CLERK, Town Hall, Aberdare, on or before November 11.

GENERAL MANAGER.

Applications are invited from fully qualified engineers for the position of General Manager to the Lahore Electric Supply Co., Ltd., Lahore, India. The selected candidate must preferably have had similar experience and an English training, and also considerable knowledge of alternating current central station work. He would be required to sign an agreement for five years, and would receive a monthly salary of Rs. 800, rising by equal annual increment to a maximum of Rs. 1,000, in addition to free conveyance. Applications will only be considered from full members of the Institution of Electrical Engineers, and may be addressed to F. P. BAKER & CO., Ltd., 4 and 5, Bond Court, Walbrook, London, E.C.

ASSISTANT ENGINEER.

Wanted, Assistant Engineer to take charge of car sheds, permanent way, and overhead equipment of tramways.

Only those with previous experience and not eligible for military service need apply.

State wages required, and when free, to the MANAGER, Sunderland District Tramways, Fence Houses, Co. Durham.

CAR SHED FOREMAN.

Tramway Car Shed Night Foreman required.—Apply, stating age, wages required, and experience.—RHONDDA TRAMWAYS CO., Ltd., Porth, Glam.

ADMIRABLE SITES FOR WORKS, FACTORIES, ETC.

The Great Central Railway passes from the Metropolis northwards through the centre of industrial England, throwing out its branches eastward and westward to the coast. Its lines run over the great coalfield which extends into the counties of Yorkshire, Nottinghamshire, Derbyshire, and Lincolnshire, thus affording an easily accessible source of fuel supply.

This coalfield is the largest in the British Isles, and was estimated by the Royal Commission on Coal Supplies (1905) to cover not only an area of approximately 4,066 square miles, but also to contain not less than forty-nine thousand million (49,000,000,000) tons of coal. The Lancashire and North Wales Coalfields are also traversed by the Company's lines.

The new eastern port of Immingham should particularly attract traders, as its modern equipment and accessibility at any time of the day or night, irrespective of tides, are important time and labour saving factors.

Adjoining the Great Central railroad at various parts of the system are situated Valuable Sites for Works, where, by the introduction of siding accommodation, goods can pass right into and directly out of the works, which greatly assists the manufacturer to attain his desired position in the world's markets.

For information please communicate with the G.C.R. Publicity Office, 216, Marylebone Road, London, N.W.

Owners and agents of land and buildings for sale or to be let near the Great Central Railway are requested to send particulars to the G.C. Estate Office, 12, Paton Street, Piccadilly, Manchester.

SAM FAY, General Manager.

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FOR SALE.

CITY OF MANCHESTER.

The Electricity Committee of the Manchester Corporation are prepared to receive tenders for the Sale of the following plant :—

"A."—Bloom Street Generating Station

One 1,800-kw. slow-speed continuous-current generator, direct-driven by a vertical cross-compound steam engine.

"B."—Stuart Street Generating Station—

One 3,750-kw. slow-speed 3-phase A.C. Alternator, direct-driven by a vertical triple-expansion steam engine.

The plant is working daily, and may be inspected at the Works named above.

Specifications of the plant may be had from Mr. F. E. Hughes, secretary, Electricity Department, Town Hall, Manchester.

Further particulars and information may be obtained from Mr. S. L. Pearce, chief electrical engineer, Dickinson Street, Manchester.

Tenders, duly endorsed and addressed to the chairman of the Electricity Committee, must be delivered at the Town Hall, not later than 10 o'clock a.m., on Wednesday, November 22.

The Corporation do not bind themselves to accept the highest or any tender.

THOMAS HUDSON,
Town Clerk.

Town Hall, Manchester.
October 30, 1916.

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THE
Tramway AND Railway World

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THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
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SATURDAY, NOVEMBER 4, 1916.

THE TRAINING OF CONDUCTORS.

No tramways or omnibus undertaking places its representatives on the rear platform without providing them with a book of rules and regulations for guidance in the performance of their duties. Doubtless the employees are tested as to their knowledge of the instructions before they are sent out to act as conductor of a vehicle, but there would appear to be a need for steps to be taken at subsequent periods to see that the men and women retain an adequate idea of what is expected from them. If rules and regulations are fully assimilated and complied with, the product would be a perfect conductor in every instance. That there are many such cannot be gainsaid; the problem is how to bring the remainder up to their level in these days of added difficulties due to the war and the restricted lighting. So greatly have these drawbacks multiplied since the first eighteen months of the war that managers must feel thankful that the full blast of trouble did not overtake them and their chief officers during the time that they were engaged in training women, girls and boys to take the place of the men who had gone to the army and munition works. The manner in which that task was accomplished in the shortened period available will form one of the brightest spots in the history of public passenger transport. The training period will no doubt become more restricted, and any plan that will aid in overcoming the laxity shown by a minority of the pupils should be employed. A monthly leaflet would be an invaluable means of keeping touch with and encouraging the employees, while a quarterly or half-quarterly meeting might prove exceedingly useful. That an occasional circular does produce a good effect is shown by the experience of the London County Council. At the beginning of the present period of restricted lighting, and also last winter, the employees were reminded of the greater need for calling out the stopping places. During the summer many of the men and women had abated their activity in that respect, with the result that on the approach of the dark evenings complaints arose from the public. Lately, however, the London employees have shown a decided improvement. Possibly an effective means of brightening up conductors generally would be to provide them after three months' service with a little manual relating to their duties. That has yet to come from the pen of some busy official, who for reward would be certain to receive the thanks of general managers and traffic superintendents. Undoubtedly the greatest need of all is that the work of men on the cars should be made a progressive business from a form of apprenticeship, instead of being the resort, as now, for adults who in many cases have failed in other occupations. This is a subject that might engage the attention of the tramway associations.

RESTRICTION OF SERVICES AND LIGHTING.

In order to facilitate traffic in busy centres at Birmingham it has been decided to fix subdued canopy lights over the wires, similar to the arrangement at the various termini. This plan was agreed upon as the result of a conference between the city surveyor, the chief constable, and the tramways manager. These lights will be automatically extinguished when the supply of energy is cut off from the wires on warning being received. Such an arrangement would facilitate the work of the conductors of London cars at places where the conduit system changes to trolley traction. With the present defective lighting, disconnection of the wheel and wire sometimes entails a loss of two or three minutes before the wheel is replaced on the cable.

The attention of the chairman of the Newcastle Tramways Committee having been drawn to the fact that in a number of cities there has been no curtailment of the services, Councillor R. Maine has replied that in such places there was not so great a demand on the workmen's cars. In Hull, for instance, only 53 cars were needed, while in Newcastle the whole of the 156 cars in service were required. The crews were on duty from 4 and 5 a.m., and the dark mornings and nights placed so great a strain upon their reduced numbers that a curtailment of the evening service was necessary. The manager, however, made no curtailment that was not unavoidable.

On and after October 30 the last cars on Sheffield Corporation Tramways will leave the central termini at about 10.40 p.m. instead of 11.10 on weekdays. In announcing the change, the Tramways department issued a time-table, giving the exact time on each route. How important the tramway service is to the citizens is shown by the "Sheffield Independent's" remark that the "restriction will mean the last straw that will break the heart of many a tired worker."

Hull Tramways Committee have asked the general manager to report on a proposal by Councillor Exley that during the winter months the cars should cease running from Victoria Square on weekdays at 10.45 p.m., and on Sundays at 10.30 p.m.

In consequence of a communication received from the chief constable, the Preston Tramways Committee have decided to consider a proposal that the last car shall leave the town at 10.30 p.m., and the various termini at 10.40.

Bradford Tramways Committee, subject to the consent of the Corporation, have empowered the general manager to curtail the services as he may think fit owing to the restricted lighting and the shortage of male labour in the department.

Lancaster Council have decided to take a poll of the town on the question of the restricted public lighting, which has given rise to complaints. It is alleged that more accidents are happening owing to the darkness than might be the case in a raid.

After having considered the results of a census of passengers during the late hours, West Ham Council have adopted the tramway manager's recommendation for curtailing the car services after 10.30 p.m.

At Nottingham the last cars leave the various termini for the centre of the city half an hour earlier, viz., from 10 o'clock to 10.42 on weekdays, and from 9.58 to 10.30 on Sundays.

From November 1 the services at Coventry cease at approximately half an hour earlier.

PURCHASE OF A. E. G. COMPANY BY DICK, KERR AND CO.

The A. E. G. Electric Company, one of the three subsidiaries in this country of the Allgemeine Elektricitats Gesellschaft of Berlin, has been sold by the controller appointed by the Board of Trade to Dick, Kerr and Company, Limited. The company was the most important of the three subsidiaries, and had offices and works in London, Newcastle, Cardiff, and Birmingham. One of the reasons advanced for the continuance of its operations after the outbreak of was is understood to have been the importance of the work it had undertaken for firms engaged on Government contracts. The liquid assets held in this country amounted to over £100,000. As these assets are now transferred to the Public Trustee practically all that was saleable, apart from stock, was the goodwill, and as the company's profits have fallen off during the war, the price paid was not large. Before the war the company employed a great number of German workmen, and the whole of the capital was held by the parent company in Berlin. During the war the German staff has been replaced by a British staff, and the latter is now taken over by Dick, Kerr and Co., together with a number of uncompleted contracts.

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ELECTRIC VEHICLE COMMITTEE.

In view of the extent to which electric vehicles are now being employed in municipal sanitary service, the Electric Vehicle Committee have issued an invitation to the Institute of Cleansing Superintendents to nominate a representative to sit upon the Committee. A circular letter has been sent to British automobile manufacturers, and another to British electrical manufacturers, suggesting that they should consider the question of taking up, after the war, the manufacture of electric vehicles in the case of the first mentioned, and electrical equipments for same in the case of the second mentioned class of manufacturers. The Recorder of the Standards Committee, Society of Automobile Engineers of America, has informed the Committee that breakages of charging plugs and receptacles made according to the present standard had indicated the necessity of increasing the length of the outer metal protective casing of the receptacle and that the American standard design had accordingly been altered by increasing the length of the said outer casing by $\frac{1}{16}$ in. (18 m.m.). The Committee have decided to suggest to the British Engineering Standards Committee the desirability of altering the British standard in a similar manner. The lengthening of the shell involves no alteration to the plug portion or to the contacts or moulded insulation of the receptacle. A letter has been received by the Committee from the city electrical engineer of Bradford relative to the period of the loan authorised by the Local Government Board for the purchase of electric vehicles. The loan for the three Bradford vehicles has been granted for a period of only four years, although it seems that in September, 1914, the Corporation were only able to get a similar period granted for the purchase of a steam wagon. The secretary has been instructed by the Committee to write to the Board, stating that while during the war the Board were no doubt guided in fixing the period for loans for such purposes largely by the abnormal state of the money market and the inflated prices of plant, the Committee trust that they will be prepared, after the war, to consider evidence which the Committee will be able to bring before them that the useful life of an electric vehicle is such as to warrant the granting of loans for a longer period than four years. The question of better charging facilities on the route London to Birmingham has again been under consideration, and the secretary was asked to write to the managers of the electric supply undertakings at Coventry and Northampton in order to enlist their assistance in this matter. The next meeting of the Committee is fixed for November 10th, at the Institution of Electrical Engineers. Mr. Shrapnell Smith, the representative of the Commercial Motor Users' Association, has been elected vice-chairman of the committee.

PURCHASE OF STEEL FOR TRAMWAYS.

The secretary of the Tramways and Light Railways Association has notified the members that in making application to the Ministry of Munitions for permission to purchase steel of any description, they should supply the information in the following form instead of in the form previously set forth :—(1) Whether they are engaged in war work ; if so giving particulars ; (2) the quantity and kind of steel now required ; (3) the purpose for which the steel is required ; (4) the name of the contractor supplying the steel. A certificate from the Ministry of Munitions is now required before steel of any description and for any purpose can be obtained.

RAILS TAKEN UP TO LAY ELSEWHERE.

In connection with the proposal of Croydon Tramways Committee to relay a portion of the Selhurst Road track and to construct a double line at an estimated cost of £2,156, the borough engineer has reported that he has been unable to obtain delivery of rails. He has been informed by the Ministry of Munitions that owing to Government requirements no definite promise could be given as to permission being granted for the rolling of the quantity of rails required. The committee have advised the Corporation that, for the safety of the public, the work should be immediately carried out, and they recommended that the required number of rails should be removed from the Whitehorse Road section, which is not being operated, and utilised for the purpose, and that subject to the necessary consents being obtained the works be proceeded with. Alderman G. J. Allen, chairman of the Tramways Committee, in moving the adoption of the report, said that it would not be possible to obtain new rails until some time next year, and it would be cheaper to take up rails in Whitehorse Road and relay them in Selhurst Road. The Council agreed to that course.

SUMMER TIME ACT: LIVES SAVED.

The Summer Time Act Committee (Mr. J. W. Wilson, M.P., chairman), have already held some preliminary meetings, as the result of which much statistical information has been compiled. When this has been collated the evidence of experts will be recorded.

At inquests held on three persons who had been killed in the streets by motor vehicles, the Westminster coroner said, on October 27, that on turning to his records he had discovered a very interesting fact with reference to the Summer Time Act. From May 15 to October 1 of the present year he only held 26 inquests on the bodies of persons killed by vehicles, while there were 57 for the corresponding period of last year.

National Register of New Work.—The President of the Local Government Board has informed local authorities that he has in contemplation a Register of work available and likely to be undertaken at the close of the war, and has invited their assistance in obtaining the necessary data.

L.C.C. TRAMWAY MATTERS.

At the fortnightly meeting of the London County Council on Tuesday, various reports relating to the tramways were submitted.

CONDUCTORS AND STOPPING PLACES.

The Highways Committee issued to conductors last winter, and have re-issued during the present month, the following notice, a copy of which is furnished to every conductor and exhibited at all car sheds :—"During the continuance of reduced lighting, conductors must, immediately before arriving at a stopping place, call out the name of the street or locality. On arrival at a stopping place, conductors must also call out the route and destination of the car to intending passengers."

WARNINGS REGARDING RAIDS.

At the request of the Commissioner of Police the Highways Committee have arranged a scheme for warning drivers and conductors of tramcars of possible hostile air raids. The expenditure involved is estimated at £624.

CLAIMS.

In respect of accidents in connection with the working of the tramways, 213 claims against the Council have been settled, the total amounts paid being about £1,500. In four of eight other actions a verdict against the Council was given, and sums amounting to £105 and costs had to be paid. The other four actions resulted in the Council's favour.

COAL FOR THE GENERATING STATION.

The Highways Committee reported that they had purchased about 33,893 tons of coal for use at the Greenwich generating station during the quarter ended September 30, 1916, at a cost of about £51,087.

INCREASE IN COST OF ENERGY.

In connection with the supply of electrical energy by the London Electric Supply Corporation, Ltd., to the Lewisham, Camberwell, and New Cross sub-stations, the Highways Committee had agreed that the price to be paid per unit as from April 1, 1916, should be increased proportionately to the increase in the cost of fuel above 20s. a ton.

APPLICATIONS FROM EMPLOYEES.

Applications for increased rates of pay, reduction in hours of labour, etc., from employees engaged in various work in the rolling stock section, the mechanical and electrical staff at the car sheds, advertisement labourers, from men in the electrical section and the permanent way section were referred to various sections of the Conciliation Board. In the case of men employed in the electrical section the increase in pay asked for is 15 per cent.

INVITATIONS TO TENDER.—LISTS OF FIRMS.

The Stores and Contracts Committee reported that they had followed the procedure laid down in regulation No. 661, as temporarily modified by the Council on July 20, 1915, for the keeping of lists of firms to be invited to tender for the supply of stores and for general maintenance work ; and, as and when occasion has demanded, they have revised the lists by adding the names of certain firms and removing others. On September 30, 1916, the total number of lists was 254, exclusive of various lists of firms to be invited to tender for special stores or work not included in the ordinary schedules. In the statement of tenders accepted they have, as far as possible, indicated the number of firms on the lists of those invited to tender. In issuing forms of tender to firms on the approved lists, the Committee have pointed out that, in the event of a firm failing to tender upon three successive occasions, the Council will consider as to removing its name from the list.

MILITARY HONOURS FOR TRAMWAY MEN.

The Chairman announced that the Military Medal had been awarded for bravery in the field to three tramway employees. Rifleman J. A. Collier (clerical assistant, Finsbury office), London Regiment ; Lance-Corporal G. Brickwood (permanent-way ganger), Royal Engineers ; and Private I. W. W. Powlesland (conductor, Holloway Depôt), Grenadier Guards. He had conveyed the congratulations of the Council. Corporal J. Thompson (permanent-way driller), East Kent Regiment, was awarded the Military Medal for gallant conduct and devotion to duty in the field in July ; he regretted to say Corporal Thompson was killed in action on September 30 last. He had sent a letter to the relatives.

The General Purposes Committee reported the deaths on active service of seventeen employees of the Tramways Department.

MISCELLANEOUS NEWS AND NOTES.

Treatment of Corrugation.—Bolton Tramways department are purchasing a rail grinder of the emery wheel type for dealing with corrugation.

Plymouth-Devonport Through Running.—Success exceeding all expectations has attended the inauguration of the linking up of the Plymouth and Devonport lines.

Centre Standards.—Middleton Council have asked the town clerk to interview the Tramways Company with a view to securing the removal of the centre standards in Long Street.

Seats for Women Conductors at Brighton.—After considering a sketch of a seat submitted by the general manager Brighton Tramways Committee have decided that seats should be provided on the car platforms for the use of the women conductors.

Work to be Done After the War.—In response to the inquiry of a Government department as to work that will require to be executed after the war, the borough engineer of West Hartlepool has included in his report the relaying of the Foggy Furze section and the proposed line at the south side of the municipal buildings. Dewsbury Corporation have included tramway extensions of an estimated cost of £2,015 in the programme of work required to be executed after the war.

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Christmas Day Holiday.—Last Christmas Day numerous tramway undertakings granted a holiday to the whole of their employees in consideration of the strain entailed by carrying on the services with a reduced staff. Coventry Tramways Committee are the first to announce a similar concession for Monday, December 25 next.

Curtains Instead of Obscured Windows.—Complaints having been made to Rawtenstall Council that the obscuration of the car windows for the purpose of the lighting restrictions has rendered it difficult for passengers to read during daylight, Alderman H. Coupe, chairman of the Tramways Committee, has announced that the cars are to be fitted with curtains.

The Anomaly of Restricted Car Lighting.—Mr. A. Baker, general manager of the Birmingham Corporation Tramways, has drawn the attention of the chief constable to the anomaly of the poor light allowed on the tramcars and that on motor-cars and cycles. It is hoped to make an arrangement to allow a diffused light to be thrown on to the road from the headlights on the cars.

Queue for Birmingham Omnibus Passengers.—In consequence of complaints that passengers on motor omnibuses arriving at New Street terminus were permitted to obtain a penny ticket in order to secure seats for the outward journey, the Watch Committee have ordered the management not to permit the practice. Passengers coming to town to travel out again are now to alight and take up position at the end of the queue.

Storage Battery Cars.—The J. G. Brill Company have recently completed an 18 ft. storage battery car for a short tramway in a small town in Texas. A similar car purchased in 1912 appears to have given satisfactory service. The tramway company intend to instal double truck storage battery cars on an extension of their line. Experience with the battery cars now in use is said to have shown that the average consumption is 1½ units per car mile.

Strike of Paris Tramway Employees.—According to the "Times," the employees of the Paris and Seine tramways have struck for an increase of 7½*d.* a day in their pay. The Cabinet on October 30 decided to introduce a Bill authorising the Government to take measures to assure a continuity of services of a public nature, the stoppage of which would compromise the national defence. The men's leaders express satisfaction with this solution.

Through Running Arrangements.—The London County Council have lent fifteen tramcars to the Metropolitan Electric Tramways, Ltd., for use on routes worked jointly by the Council and the company, subject to the company paying the capital charges on the cars, an agreed sum for the use of the cars and for spare parts at cost price plus 10 per cent. for establishment charges, and bearing the cost of the maintenance and annual renovation of the cars.

Rochdale Cars and Wind Screens.—After considering a report prepared by the general manager on the steps taken on other tramway undertakings to protect motormen from the weather, either by means of vestibules or wind screens, the Tramways Committee have discussed the question with representatives of the employees. As a result they have resolved to take no action at present, but are prepared later to experiment with screens on a few cars on the Bacup section.

Sunderland Wages Arbitration.—Sunderland Corporation Tramways undertaking having been brought under the Munitions of War Act, Mr. W. H. Stoker, K.C., has sat as arbitrator on an application by the employees for an increase of 1*d.* an hour all round. The award will be made known in due course. York Council have granted an advance of 5*s.* per week to tramway inspectors. A war bonus of 2*s.* per week has been given to motormen and conductors at Croydon, and 1*s.* to women conductors.

Cars Damaged by Fire at Chesterfield.—As the result of a fire in the Chatsworth Road depot during the early morning of October 20, a double deck car body was destroyed and six other cars were more or less damaged. The outbreak originated in the paint shop, which was burnt out, while a considerable portion of the remainder of the depot was damaged. Owing to the severance of the cables by the flames the cars had to be moved by men pushing them. The firemen prevented the flames attacking the adjoining motor-omnibus depot.

Accurate Forecast on Increased Fares.—At a meeting of Croydon Corporation Alderman Trumble congratulated the chairman of the Tramways Committee and the manager on correctly forecasting the probable increase expected from the increased fares. It was estimated that these would produce 6 per cent., and the reduced number of passengers had paid 6 per cent. more than they did before. It was found that what the motor omnibuses could not carry got into the tramcars, and he considered they were doing a great deal of harm in depopularising the cars.

Institution of Automobile Engineers.—The second general meeting of the session of the Institution of Automobile Engineers will be held in the hall of the Royal Society of Arts, John Street, Adelphi, W.C., on Wednesday, November 8, 1916, when a paper by Mr. A. Ludlow Clayden, entitled "Electrical Car Equipment," will be read. The chair will be taken by the President of the Institution, Mr. L. A. Legros, at 8 p.m. Cards of invitation to the meeting may be obtained on application to the Secretary, Institution of Automobile Engineers, 28, Victoria Street, Westminster, London, S.W.

War Savings Association.—Some years prior to the outbreak of war a number of the employees of Siemens Brothers and Co., Ltd., formed amongst themselves a Thrift Club which has had a successful career. As a branch of the club a War Savings Association has been organised at the Woolwich works under the name of "The Bowater War Savings Association." Its management is exclusively in the hands of a committee of employees. Since the inception in June last the membership has increased from 500 to about 1,400 and, up to the present, nearly 4,000 war savings certificates have been purchased.

Car Traffic During Raids.—Some confusion seems to have arisen among tramway operators in the outer areas of East London as to whether the military authorities prohibit the running of the cars into the depôts on the receipt of an air raid warning, or whether the prohibition refers only to bringing the cars to a standstill in the streets. Ilford Council at their last meeting received a letter from the Commissioner of Police, stating that any proposal to stop tramway traffic is not approved by the Field Marshal, and further that the competent military authority may feel it necessary to issue a specific order under the powers conferred by the Defence of the Realm Regulations. The Tramways Committee had directed the clerk to inform the Commissioner, with the greatest possible respect, that the definite opinion of the committee is that the steps taken by the Council (running the cars into the depôt) in the interests of public safety are advisable. The Council decided to send a letter to the Commissioner reiterating their views and stating that if anything happened the responsibility would rest upon the military and not upon the council.

Free Riding and Its Abuse.—Burnley Tramways Committee have agreed to provide free car tickets for wounded soldiers, while Bristol Tramways Company have granted soldiers in hospital uniform the privilege of riding on any car for a penny fare. This will prove of great advantage to the men in the hospitals in the outlying districts, while those in the Royal Infirmary will be able to travel to Durdham Downs. Cardiff Tramways Committee have agreed to grant concessions to soldiers unable to walk a reasonable instance, but Sir John Courtis, the chairman, and the general manager informed a deputation that there could not be a general issue of free tickets, as that method was liable to abuse. Sir John added that the best course would be for the public to subscribe to a fund. We may add that an instance of improper use was mentioned by Councillor Russell Taylor, chairman of Liverpool Tramways Committee, in repudiating an assertion that soldiers frequently had to pay fares. He stated that since the department had issued passes to soldiers or sailors, wounded or otherwise, they had not received any complaints. In two towns only did the military or naval uniform carry, and there the boroughs were small ones. It was necessary to issue tickets for checking purposes. They had issued 8,546,000 passes to wounded soldiers and sailors, 240,200 passes to medical gentlemen, and 153,400 to nurses, making a total of 8,939,000 or thereabouts. That represented, at an average of 1*d.*, £41,300. In the week ended September 30, 75,000 passes were issued. The question of carrying these men free would have to be reconsidered, as the department could not carry passengers as they should be carried in the "crush" hours. Adverting to the risk of fraud the chairman mentioned a case in which a soldier working on munitions and earning over £3 a week was detected using a pass on which he had signed another man's name.

PERSONAL.

Mr. A. C. Swales has relinquished the secretaryship of the Junior Institution of Engineers, owing to ill-health.

Mr. L. E. Harvey, general manager, Ilford Council Tramways, has been granted an increase in salary from £460 to £480.

Colonel Sir H. C. L. Holden, director of mechanical transport at the War Office, has been elected upper warden of the City Guild of Gunmakers.

Councillor J. Harrison, convener of the Tramways Committee of Edinburgh Corporation, is mentioned as one of four probable candidates for the impending vacancy in the Lord Provostship of the city.

Oldham Employees' War Distinctions.—Sergt.-Instructor Hope Travis, an enlisted employee of Oldham Corporation Tramways, has gained the Distinguished Conduct Medal, and Company-Sergt.-Major J. Holmes, another former employee, has been recommended for the same distinction.

Captain Leo Myers, a director of the Auckland Electric Tramways, joined the army as a private in the early days of the war. At a meeting of the Auckland Electric Tramways on Tuesday the chairman said that Mr. Myers had worked his way to commissioned rank, and he was sure that the shareholders would join the Board in congratulating him on his appointment to a position on the Home Staff.

Lieut. C. Basil Harness.—Many of our readers will be interested to hear that Mr. Albert Harness, of the India Rubber Products Company, Ltd., of Liverpool, has received news of his brother, Lieutenant C. Basil Harness, of the Middlesex Regiment, now attached to the King's Royal Rifle Corps, who was in Egypt for some considerable time, that he has now been transferred to the Salonica forces. Before joining his original battalion he was associated with the Goodrich Tyre Company and was the managing director of the South African branch of the Prowodnick Company of Riga.

Mr. Adams Gowans Whyte, editor of "Electrical Industries," is the author of a recently-published novel, "The Correct Thing." As a reviewer in "The Times" remarked, "there is real fibre and thought in the novel and a good deal of literary power." The dialogues of the characters, to which the author has evidently devoted much care, are marked by unusual discernment and insight, and they add not a little to the interest of the story. An earlier novel by Mr. Whyte, "The Comedy of Ambition," was highly commended by some eminent critics and won the praise of many whose literary tastes are not easily satisfied.

Sergeant H. W. Atkinson, Duke of Wellington's West Riding Regiment, who has been killed in action, was a traveller for the United Electric Car Company. At the time of his enlistment he was 43 years of age.

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CONTRACTS AND ORDERS.

Edgar Allen & Co. are supplying special trackwork for the Wolverhampton Corporation Tramways.

Messrs. Worringham and Company, Deptford, S.E., have received an order for car axle oil for the London County Council's tramways.

Messrs. Johnson Brothers and Company, of Ford Road, Bow, E., have an order from the London County Council for 1,450 oilskin coats for motormen.

Chatteris Engineering Company, Ltd., have a contract from Sheffield Corporation for converting to electrical working a 20-ton overhead travelling crane at a cost of £902.

Thomas Tilling, Ltd., have been awarded the contract by London County Council for the supply of horses for drawing trailer cars to and from the depôt at Evelyn Street, at the rate of £145 a horse a year.

Shepherd's Parging Block Company, Ltd., of Rochdale, have received an order for the supply of their block parging to the Bexley Council tramways, Rochdale Corporation tramways, and Rhondda Valley tramways.

Tramway Material for L.C.C. Tramways.—Orders for tramway material and the execution of small works and repairs, at an estimated cost of £38,110, arranged by the Highways Committee, have been approved by the Council.

Wolverhampton Council have given an order to Messrs. Melville, Dundas and Whitson to supply and fix a crane gantry at the electricity works, and to Gibbons Bros., Ltd., for a steel roof to the boiler house of the generating station.

H. Lotery and Company, Ltd., whose contract of November 30, 1915, for uniform clothing for the parks department of the London County Council has been reconsidered, have been granted a new contract as from January 1, 1917, at slightly increased prices.

Tudor Accumulator Company have agreed to an extension for twelve months of their contract for maintaining the batteries of two ambulance vehicles belonging to the Metropolitan Asylums Board, which are used at Queen Mary's Hospital.

Victorian Railway Commissioners have placed the following contracts:—Motor generator, etc., for battery charging of baggage trucks, switchboard and connections, Electric Construction Co., Ltd.; electric lamps for signal system, Edison-Swan Electric Co., Ltd.; lampholders for signal system, Australian General Electric Co.

Switchgear for L.C.C. Tramways.—The offer of the British Westinghouse Electric and Manufacturing Company, amounting to £2,964, for the alteration of existing low tension wiring and the provision of a portion of the switchgear for the third additional turbo-generator to be installed at Greenwich generating station, L.C.C. Tramways, has been accepted.

Castings for Permanent Way.—Ninety firms were recently invited by the London County Council to tender for steel and iron castings for permanent way for the tramways department. The following are the successful tenderers: Hadfields Ltd., East Hecla Works, Sheffield; Robert Hyde and Son, Ltd., Abbeydale Foundry, Sheffield; John Needham and Sons, Ltd., Millgate Foundry, Stockport, and Samuel Osborn and Company, Ltd., Clyde Steel Works, Sheffield. Some iron castings will be supplied by R. A. Bradshaw and Son, Retford.

FINANCIAL REPORTS AND MEETINGS.

Darlington Corporation Tramways.—The accounts for the past year show that the receipts amounted to £14,660, the traffic revenue being £14,414. The number of passengers was 4,439,278, as against 4,234,783 in the previous year. The gross profit was £5,058, but after paying interest on loans and meeting the loss of the previous year there was a net loss on the year of £1,087.

L.C.C. Tramway Receipts.—The traffic receipts for the two weeks ended October 18, 1906, were £98,356, an increase of £5,071, as compared with the corresponding period last year. The number of passengers was 23,414,103, an increase of 1,721,613. From April 1 to October 18 (twenty-eight and a half weeks) the total receipts were £1,408,250, an increase of £140,908 on the corresponding period of 1915. The route mileage was 141.67.

Norwich Tramways Company.—At the twentieth annual meeting, held in London on October 30, Mr. Charles Pakeman (vice-chairman), presided and moved the adoption of the report, which recommended payment of a dividend of 3 per cent. for the year ended June 30, placing £5,000 to the reserve fund account, and £1,000 to the 1914 Act account, and carrying forward £428. The only point that called for comment, he said, was the large sum placed to the reserve fund account. This provision had been made because, owing to the lighting restrictions, it had not been possible during the year to carry out all the renewals that had been planned. This amount would otherwise have been largely spent on these purposes. Mr. E. A. Hopkins was re-elected as a director.

Auckland Electric Tramways.—Mr. C. G. Tegetmeier, presiding at the ordinary general meeting of this company on Tuesday, said that in spite of adverse conditions the traffic receipts for the year ended June 30 showed an increase of £6,989 over the preceding year, the total being £274,783, or at the rate of over £10,000 per route mile. The number of passengers carried was 42,352,000, an increase of nearly a million. The receipts have increased by nearly 3 per cent notwithstanding that a large proportion of the male population of Auckland had left industrial pursuits to share in the defence of the Empire. Concessions from various suburban authorities expired at various dates from 1934 onward, and the terms of purchase were favourable to the company, being based upon the value of their undertaking as a going concern.

Dunlop Rubber Company.—The directors announce a further dividend of 10 per cent. on ordinary shares, making 15 per cent. for the year ended August 31. The dividends for each of the three previous years were similar to those proposed for the past year, while 12½ per cent. was paid on ordinary shares for 1911-12. Creation of 1,000,000 B preference shares of £1 each, entitled to a fixed cumulative dividend of 6½ per cent., is recommended by the Board.

Cape Electric Tramways.—The report for the year ended June 30, 1916, shows gross earnings of £212,702, an increase over the previous year of £6,669. The profit on the Cape Town and Port Elizabeth Tramways amounted to £81,877; interest on investments, £2,301 and transfer fees £12, making a total of £84,190. General and office expenses amounted to £1,480, income tax provision and excess profits duty on profits to June 30, 1915, £8,358, interest and exchange £388, directors' fees £1,300, trustees' fees £166, leaving a balance of £72,497. After providing for debenture interest, redemption of debentures, and taking into account the balance brought forward from last year, there is a net credit balance of £31,404. A sum of £5,000 has been placed to reserve, leaving a balance of £26,404. The directors recommend the payment of a dividend for the year of 3¾ per cent. on the ordinary share capital, and this will absorb £18,421, leaving a balance to be carried forward to next year of £7,983. The passengers carried during the past year totalled 22,477,366, as against 21,680,070. A small improvement in traffic receipts was more than counterbalanced by the increased cost of operation due to labour charges and allowances granted to employees who have joined the forces. Excess profits duty and increased income tax charges have also had to be met.

INCOME TAX AND LOCAL AUTHORITIES.

"Income Tax in Relation to Local Authorities" is the title of a most useful book by Mr. F. Ogden Whiteley, city treasurer of Bradford, and Mr. William Whittingham, of the city treasurer's department, Bradford, which has just been published by Messrs. William Byles and Sons, Ltd., of that city. Questions of the tax to be levied, or rather, as a basis, the assessments to be fixed on the properties of local authorities, are of a complicated character and in the past have led to much dispute and negotiation between corporations and inland revenue authorities. On many points settlements have been arrived at and largely owing to the efforts of the Institute of Municipal Treasurers and Accountants there has been a codification of the rules on which the assessments of the undertakings of local authorities are to be computed. The present book contains a sketch of important cases of disputed assessments, deals with the subject of depreciation allowances, and describes the condition of assessment of various undertakings. Among the latter are of course tramways, and a copy is given of the scheme which is now in force in regard to depreciation allowances for tramways and other undertakings. Cases are worked out also showing how the assessable profits of tramway undertakings are computed. That the book is well up to date is shown by the fact that a couple of chapters are devoted to the excess profits duty which only came into existence about a year ago. The book ought to prove of great value to everyone concerned on the administrative and financial sides of municipal undertakings, for it contains that specialised information which it is often so difficult to find in general works of reference.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-four of the principal tramway undertakings in the United Kingdom for the week ended October 21 give total receipts of £184,067, or £14,152 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or sixty-six more than for the corresponding week. The receipts this year were at the rate of £82 10s.9d. per mile of single track, and last year at the rate of £78 11s.1 d., thus showing an increase for the week of £3 10s. 8d. per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

DIVIDENDS. PREV.	DIVIDENDS. LAST.	NAME.	PAID.	PRICE, JULY 27 1914	CASH. Nov. 2.	A WEEK AGO.
5%	5%	Alabama Traction, 5% 1st. Mt.	—	67	70½	70½
2/9	2/9	Anglo-Argentine 5½% Pref.	5	4¼	63/9	65/-
4%	4%	Do. 4% Deb.	100	91	69	68½
4½%	4½%	Do. 4½% Deb.	100	98½	74	74
5%	5%	Do. 5% Deb.	100	96	68½	69
1/-	7d.	Auckland Elec. Trams. Ord.	1	1⅝	21/-	21/-
5%	5%	Do. 5% 1st Mt. Deb.	100	102½	94½	94½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref.	10	11½	10½	10½
4½%	4½%	Do. 4½% Deb.	100	96	83	83
5%	5%	Do. 5% 2nd Mt. Deb.	100	100	91½	91½
$¼	$1	Brazilian Trac. & Power Ord.	$100	66	56½	54½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	92	91½
4/-	4/-	Brisbane Elec. Trams. Ord.	5	7½	6½xd	7
2/6	2/6	Do. 5% Cum. Pref.	5	5	85/-	85/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord.	100	107	58½	58½
6%	5%	Do. Pref. Ord.	100	106	56½	56½
5%	5%	Do. 5% Cum. Pref.	100	103	70	70
4½%	4½%	Do. 4½% 1st Mt. Debs.	40	99½	86½	86½xd
4½%	4½%	Do. 4½% Perp. Con. Deb.	100	96½	66½	66½
—	£3*	Brit. Elec. Trac. Ord.	100	—	35½	35½
—	6%	Do. 6% Cum. Part Pref.	100	—	77	77
5%	5%	Do. 5% Deb.	100	92	83½	83½
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	71xd	71
5%	5%	B.A. Lacroze 5% Mt. Deb.	100	100	81½	81½
3/-	6/6	Calcutta Tramways, Ord.	5	7½	6⅞xd	7⅝
1/3	1/3	City of B.A. Trams.	5	5½	85/-	85/-
5/-	4/-	Dublin United Trys 6% Pref.	10	12	11	11
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79½	79½
2/6	3/-	Isle of Thanet 5% Pref.	5	2½	27/6	27/6
5%	5%	Kalgoorlie Trams. 5% A. Deb.	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅞	2/1½	2/1½
6/-	6/6	Lanarkshire Trys. Co.	10	10½	9⅛	9⅛
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9⅜d.	9⅜d.*	Llandudno & Colwyn B. Ord.	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord.	1	1½	2/4½	2/4½
6d.	6d.	Do. 5% Pref.	1	1/16	8/-	8/-
4½%	4½%	Do. 4½% 1 Mt. Deb.	100	75½	64½	64½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	89½	89½
5%	5%	Do. 5% Inc. Deb.	100	88½	80½	81
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	47½	47½
3/-	3/-	Madras Elec. 6% Pref.	5	5⅛	96/6	96/6
5%	5%	Manaos Trams. 5% 1st Deb.	100	77	66½	66½
$1½	$1½	Manila Elec. R. R. & Light	$100	102	68	68
4½%	4½%	Met. Elec. Trams. 4½% Deb.	100	85½	75½	75½
$1½	$1½	Mexico Trams. Common	$100	70	31½	31½
5%	5%	Do. 1 Mt. 5% G.B.	—	8¼	4⅜	4⅜
6%	6%	Do. 6% Mt. Bds.	100	76	33½	33½
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	93	94½
4½%	4½%	Do. 4½% Sig. Debs.	100	99	95	95
1/-*	1/2½*	National Steam Car	1	½	20/1½	20/6
9½d.*	9⅜d.*	New General Traction	1	¾	7/9½	7/9½
8½d.	6d.	Northern Gen. Trans. Ord.	1	⅝	15/4½	15/4½
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	68/9	70/-
5%	5%	Do. 5% 1st Deb.	100	80½	74½	74½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80½	80½
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	⅝	11/3	11/-
10d.	8d.	Provincial Trams. Ord.	1	¾	17/-	17/-
5%	5%	Rhondda Trams. 5% 1 M.D.	100	88	84/-	84/-
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	91½	91½
5%	5%	1st. Mt. 5% 50 yr.	100	89½	75½	74½
5%	5%	Sao Paulo Deb. 5% 1st Mt.	$500	99	90	90
5%	5%	Do. 5% Perp. Deb.	100	99½	77½	77½
—	—	Singapore Elec. Trams.	5/-	¼	4/10½xd	4/10½
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	96½	96½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	81	82½xd
4½%	4½%	Toronto 1st Mt. 4½% Bds.	100	98	98	95
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	77	77
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	¾	9/3	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4½	99/6	99/6
—	—	Metropolitan Dist. Ord.	100	21½	16	16
—	—	Undgd. Elec. Rys. of London	10	2½	35/-	36/-
		Do. "A"	1/-	¾	5/4½	5/3
4½	4½	Do. 4½% Bds of 1933 Rd.	—	99	101½	101½
6	6	Do. 6% 1st Cum. In. Db.	100	114	101½	102
6	6	Do. 6% In. Bonds Rd.	—	88	89½	88½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1915	1916	Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	Oct. 28	£48,033	£52,134	44	£2,190,543	+ £4,444
Auckland (28 days)	Oct. 20	20,831	21,428	16	84,286	+ 1,160
Ballarat and Bendigo	Aug. 13	2,860	2,791	20	15,870	+ 836
Brazilian Traction Mlrs.	Sept.	6,494 000	6,920,000	39	61,249,000	+3,791,890
Brisbane	Sept.	30,360	32,530	39	297,000	+ 22,586
British Columbia $	Sept.	517,022	540,440	13	1,629,026	+ 94,155
Buenos Aires Lacroze	Oct. 4	42,516	39,670	17	151,615	+ 13,184
Burmah Tramway Rs.	Sept.	22 163	23,749	9	48,161	— 839
Calcutta Rs.	Oct. 21	66,319	65,596	43	2,858,015	+ 129,811
Cape Town	Aug.	...	13,394	...	...	...
Carthagena & Herrerias	Oct.	2,169	2,539	44	25,139	+ 7,390
Cordoba	Aug.	14,159	13,852	22	71,165	+ 469
East India	Oct.	2,069	2,080	13	7,125	+ 736
Hong Kong $	Sept. 30	10,506	14 272	42	569,469	+ 140,436
Kalgoorlie	Aug.	3,165	3,021	35	20,479	— 1,640
La Plata	Sept.	3,894	3,994	39	37,622	— 257
Lima	Sept.	30.530	33,348	39	364,058	+ 15,777
Lisbon Escu.	Aug.	...	204,703	...	...	...
Madras (2 weeks)	Oct. 31	31,293	31 819	43	633,910	+ 45,027
Manila	July	23,750	32,700	31	887,739	+ 39,986
Manaos Rs.	Aug.	...	147,774	...	...	...
Melbourne	May	...	69,275	...	...	...
Montevideo	Sept.	25,070	26,711	48	319,643	+ 15,626
Pernambuco	Oct. 29	2,968	3,166	43	130,535	— 1,818
Peruvian $	Sept.	755,280	911,910	13	2,643 240	+ 344,083
Port Elizabeth	Aug.	...	2,863	...	...	...
Rangoon	Sept.	4,445	4 137	39	41.328	— 2,001
Shanghai $	Oct. 13	28,298	33,337	...	...	...
Singapore $	Sept. 16	11,564	13,702	37	465,108	+ 49,017
Toronto $	Sept.	804,902	913,535	39	8,005,764	+ 855,159
Winnipeg	Sept.	261,982	267,497	39	2 461 454	— 51,995

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	1916	Incr. or Dec.	Aggregate. Wks.	1916	Incr. or Dec.
Aberdare U.D.C.	Oct. 24	£339	£407	+ 68	30	£11,876	+ £1,360
Aberdeen Corporation	,, 25	1,619	1,771	+ 152	21	41,289	+ 2,373
Accrington Corp.	,, 18	545	571	+ 26	29	17,173	+ 636
Ayr Corporation	,, 28	245	278	+ 33	24	11,905	+ 1,022
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	,, 29	1,314	1,547	+ 233	30½	47,307	+ 4,702
Birmingham Corp.	,, 28	15,023	15,133	+ 110	30	495,992	+ 66,720
Do. Motor Omnibuses	,, 28	815	962	+ 147	30	30,311	+ 3,880
Blackburn Corp.	,, 25	1,087	1,158	+ 71	30½	39,765	— 1,064
Blackpool & Fleetwood	,, 28	356	379	+ 23	43	41,148	+ 4,853
Blackpool Corp.	*	...	...	...	...	...	...
Bolton Corporation	,, 29	2,581	2,737	+ 156	31	89,883	+ 6,266
Bournemouth Corp.	Nov. 1	1,771	2,049	+ 278	31	75,294	+ 6,509
Bradford Corporation	Oct. 28	5,914	6,358	+ 444	30	210,937	+ 7,719
Brighton Corporation	,, 29	940	1,133	+ 193	30½	41,148	+ 4,278
Bristol	,, 27	8,910	9,811	+ 901	43	435.278	+ 22,708
British Elec. Federa'n	*	...	...	...	...	...	...
Burnley Corporation	,, 28	1,560	1,595	+ 35	31	53.730	+ 2,984
Burton-on-Trent Corp.	,, 29	262	285	+ 23	30	8.564	— 506
Bury Corporation	,, 29	1,291	1,274	— 17	31½	45,012	+ 2,084
Cardiff Corporation	,, 21	2,540	2,993	+ 453	29	89,500	+ 8,031
Chatham & District	,, 26	1,061	1,212	+ 151	43	53,408	+ 2,638
Chesterfield Corp.	,, 26	258	237	— 21	30	8,589	+ 297
Colne Corporation	,, 28	278	250	+ 28	...	...	...
Cork Electric	,, 26	486	493	+ 7	43	22,129	+ 290
Croydon Corporation	*	...	...	...	...	...	...
Derby Corporation	,, 31	975	1,113	+ 137	30½	35,141	+ 2,536
Dover Corporation	*	...	...	...	...	...	...
Dublin & Lucan	,, 27	135	151	+ 16	17	3,070	+ 239
Dublin United	,, 27	5,833	6,164	+ 331	43	262,292	— 936
Dundee City	,, 25	1,321	1,354	+ 33	23½	33,167	+ 773
East Ham Corporation	,, 28	1,246	1,251	+ 5	30½	40,397	+ 200
Exeter Corporation	,, 27	340	377	+ 37	30	12,524	+ 494
Glasgow Corporation	,, 28	21,866	23,936	+ 2,070	21½	505,509	+ 36,376
Glasgow Subway	,, 28	1,182	1,219	+ 37	43	49,176	+ 4,230
Glossop (U. Elec. Supp.)	,, 28	127	140	+ 13	44	6,135	+ 601
Halifax Corporation	,, 24	2,007	2,097	+ 90	29½	69,405	+ 1,016
Do. Motor Omnibuses	,, 24	44	49	+ 5	29½	1,507	— 47
Hastings & District	,, 27	739	836	+ 97	43	46,122	+ 2,970
Huddersfield Corp.	,, 28	2,450	2,661	+ 210	30	87.669	+ 7,664
Hull Corporation	,, 28	2,982	3,119	+ 137	30	94.764	+ 1,605
Ilford U.D.C.	,, 28	582	625	+ 43	30	21,164	+ 1,114
Ilkeston Corporation	*	...	...	...	...	...	...
Ipswich Corporation	,, 28	493	436	— 57	30	16,481	— 907
Isle of Thanet	,, 28	246	258	+ 12	4	1,224	— 94
Kilmarnock Corp.	,, 28	164	177	+ 13	23½	4,253	+ 78
Lanarkshire	,, 26	2 001	2,448	+ 447	43	99,916	+ 14,592
Lancashire United	,, 25	1,617	1,869	+ 252	43	79.272	+ 4,073
Leeds City	,, 28	8,314	9.585	+ 1,271	31	302,067	+ 27,259
Leicester Corporation	*	...	...	...	...	...	...
Leith Corporation	,, 28	749	842	+ 93	23½	21,352	+ 2,559
Leyton U.D.C.	,, 26	1,506	1,449	— 57	30	51,411	+ 931
Liverpool Corporation	,, 28	12,963	14,265	+ 1,302	43½	610,047	+ 32,431
Llandudno & Colwyn B.	,, 20	250	284	+ 34	46½	17,502	+ 1,089
London County Council	,, 18	45,729	50,215	+ 4,486	26½	1,309,893	+ 134,937
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation	*	...	...	...	...	...	...
Maidstone Corporation	,, 26	182	197	+ 15	30	6,822	— 157
Manchester Corp.	,, 28	17,621	18,678	+ 1,057	29	576 883	+ 30,820
Met. Elec. Trys.	*	...	...	...	...	...	...
National Steam Car	*	...	...	...	...	...	...
Nelson Corporation	,, 28	194	214	+ 20	30½	6.609	+ 514
N'castle-on-Tyne Corp.	,, 28	6,388	6,985	+ 597	30	203,480	+ 10,309
Newport (Mon.) Corp.	,, 28	783	961	+ 178	30	29,236	+ 3,190
New St. Helens & Dist.	,, 25	897	1,085	+ 188	17	20,342	+ 1,392
Northampton Corp.	,, 27	651	714	+ 63	36	21,678	— 1,165
Nottingham Corp.	,, 26	3,561	3,939	+ 378	30	119,508	+ 5,080
Oldham Corporation	,, 29	2.250	2,214	— 36	31	78,708	+ 4,427
Portsmouth Corp.	,, 28	2,054	2,464	+ 410	...	...	...
Preston Corporation	,, 25	909	1,137	+ 228	29½	33,466	+ 4,131
Provincial	,, 28	1,996	2,134	+ 138	4	9,039	+ 417
Reading Corporation	,, 26	757	859	+ 102	29½	26,209	+ 1,949
Rhondda Tramways	,, 26	1,170	1,384	+ 214	43	55,546	+ 4,850
Rochdale Corporation	,, 28	1,586	1,611	+ 25	30½	55,870	+ 2,186
Rotherham Corp.	Nov 1	1,274	1,588	+ 314	30½	48,137	+ 12,035
Salford Corporation	Oct. 30	5.051	5,231	+ 180	29½	169.862	+ 8,428
Sheffield Corporation	,, 29	9,008	10,489	+ 1,481	31½	329,468	+ 51,047
Southampton Corp.	,, 25	1,426	1,623	+ 197	29½	50,926	+ 4,572
Southend-on-Sea Corp.	,, 25	614	685	+ 71	30	30,918	+ 3,549
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	,, 26	761	815	+ 54	30½	25,859	+ 1,202
Sunderland Corp.	,, 29	1,428	1,625	+ 197	30	50,476	+ 3,877
Sunderland District	,, 25	573	698	+ 125	51	32,423	+ 2,303
Swindon Corporation	,, 18	191	205	+ 14	28½	6,056	+ 156
Torquay Tramways	,, 26	427	520	+ 93	43	26,350	+ 2,068
Tyneside Trys. & Tmrds.	,, 18	574	633	+ 59	16	11,247	+ 536
Wallasey Corporation	,, 28	1,093	1,221	+ 128	30½	43,531	+ 2,639
Walsall Corporation	,, 28	767	822	+ 55	44	35,600	+ 3,310
Walthamstow U.D.C.	,, 28	708	979	+ 271	30	34,522	+ 5,702
Warrington Corp.	,, 26	448	509	+ 61	30	14,962	+ 1,250
West Ham Corporation	,, 26	2,881	3,091	+ 210	29½	98,680	+ 4,009
Wigan Corporation	,, 26	1,682	1,720	+ 38	30	50,942	+ 4,202
Yorkshire (W. Riding)	,, 29	1,398	1,672	+ 274	44	77,582	+ 7,877

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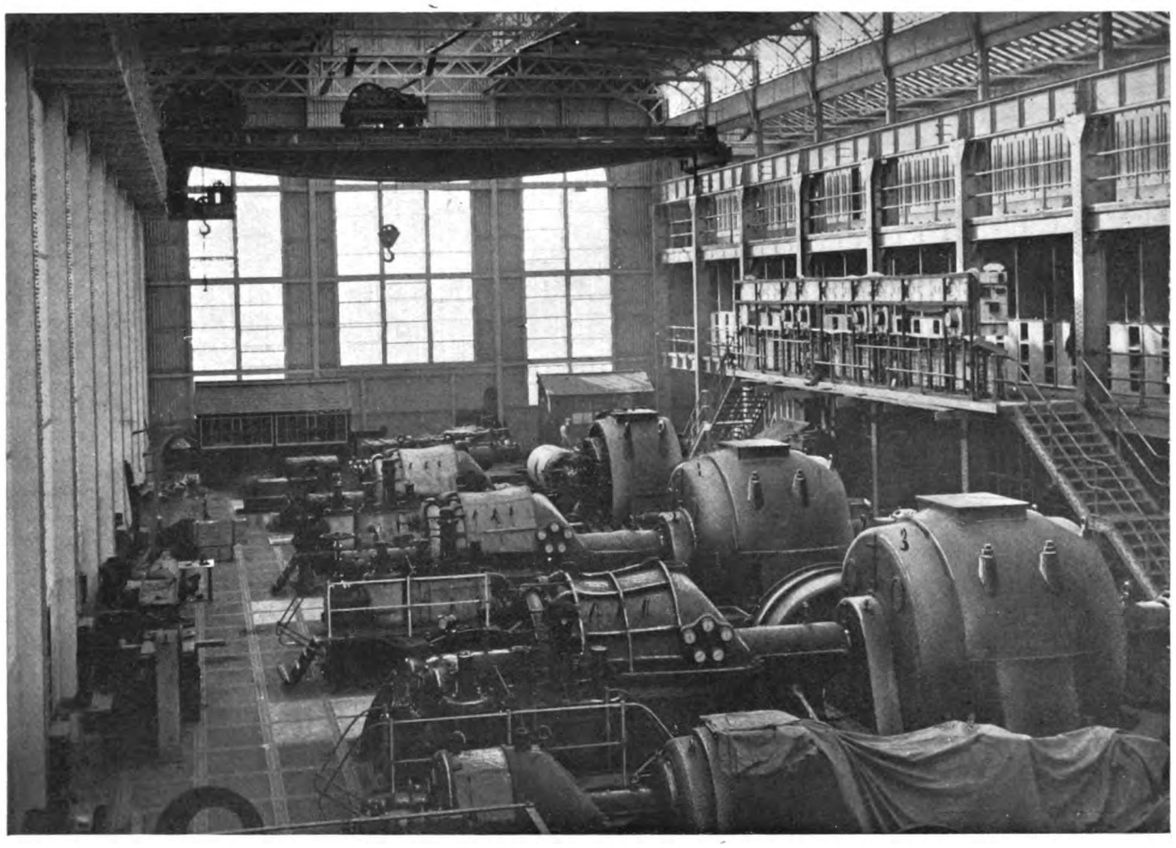
LONDON & NORTH WESTERN RAILWAY ELECTRIFICATION.

EQUIPMENT OF THE BROAD STREET TO RICHMOND ROUTE.

On October 1 last electric trains began running between Broad Street terminus in the city of London and Richmond. This marks the opening of the third instalment of the great scheme of suburban electric traction which the London and North Western Railway Company are developing. Electric working began on the first section to be dealt with—namely, the West London and the West London extension railways from Willesden to Earl's Court, a distance of $3\frac{3}{4}$ miles—on May 1, 1914. The second stage was reached on January 31, 1915, when the extension of the Baker Street and Waterloo Railway from Paddington to Queen's Park, Willesden, a distance of $1\frac{1}{2}$ miles, was opened for traffic. The tube railway trains since then have run to Willesden Junction from Queen's Park on the new electric tracks of the London and North Western Company. The latest development is of much greater length, the distance from Broad Street *via* Willesden being about 16 miles.

We have on previous occasions given a description of the general scheme which the North Western Company have in hand. Additional details are now available, and a general conspectus may now be taken. The scheme, it may be recalled, includes the construction of a new double track railway from Chalk Farm to Watford alongside the existing main line, a branch line at Watford, the extension of the Baker Street and Waterloo Railway to Willesden so as to put the North Western Company's suburban lines into direct connection with the underground railways of London, and the electrification of the following steam lines :—North London, Hampstead Junction, Willesden to Earl's Court, Willesden to Kew Bridge and Gunnersbury, and main line tracks between Euston and Chalk Farm. The total route length is $41\frac{1}{2}$ miles, representing nearly 100 miles of single track. The accompanying map shows how the lines of communication radiate from Willesden Junction. All the work is now far



London and North Western Power Station at Stonebridge Park.

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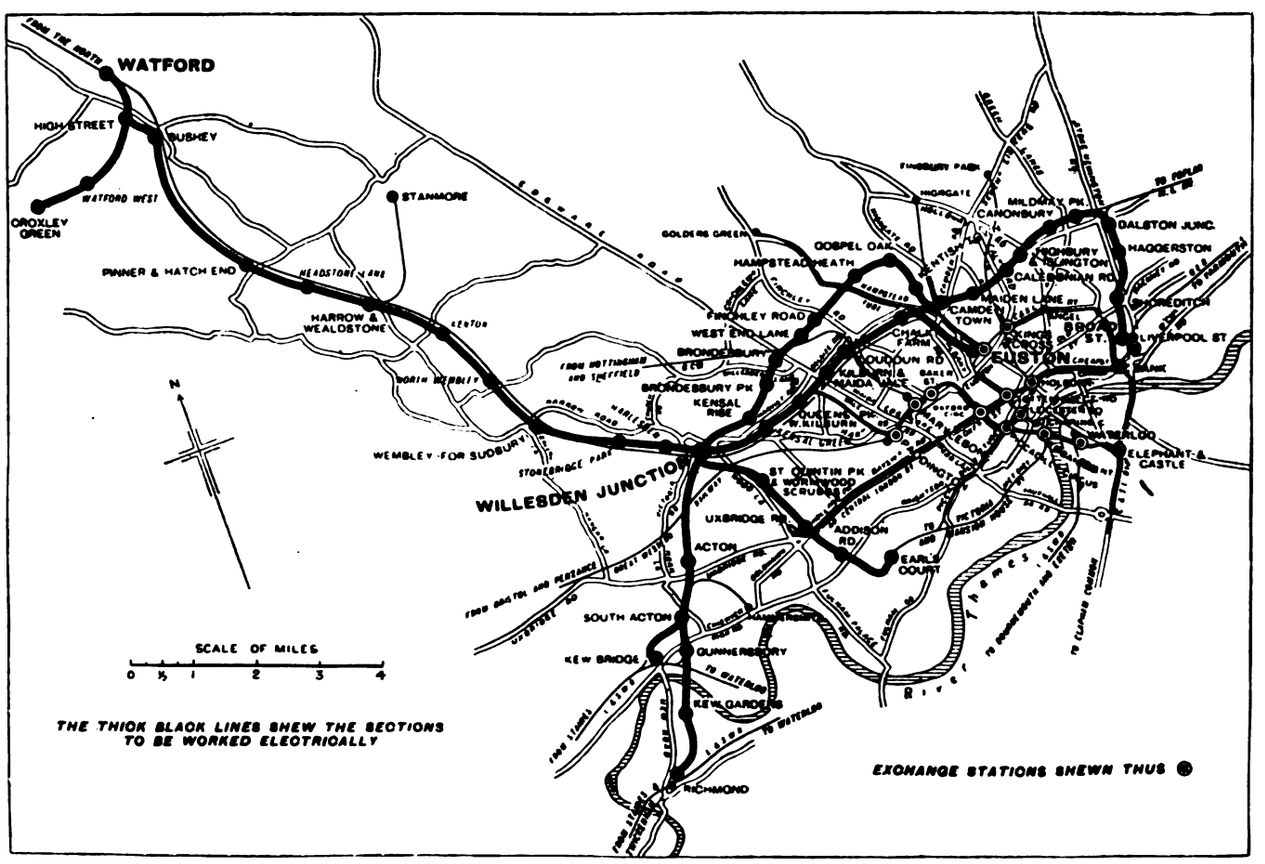
advanced. It should be noted that the part of the route from Gunnersbury to Richmond is a London and South Western Company's line already electrified.

The beginning of electric working from Broad Street and Euston over the new tracks between Chalk Farm and Willesden is delayed, as owing to war conditions the tunnels (nearly a mile long) under Primrose Hill are not yet completed. Meanwhile the Hampstead loop is being used for the electric trains. Heavy work has also been required at Chalk Farm where a complication of junction lines occurs. New bridge and retaining wall works on a large scale have been necessary. The new works, including tracks at three different levels, have been required in order to provide for the frequent electric train services from and to Euston and Broad Street and in order that the main line steam trains should not be interfered with. A new station has been erected at Kensal Green, and several existing stations have been reconstructed.

a little further east. The power station follows usually accepted designs. Repair shops for the electric rolling stock have been erected adjacent to the power house. The building is of brick, with a steel framing, and boiler house and turbine house are placed side by side. The former, with a central firing floor and overhead coal bunkers, contains 20 Babcock & Wilcox boilers, equipped with drop link automatic stokers and coal weighing machines. Each boiler is designed to evaporate 25,000 lb. of water per hour and to supply steam at 200 lb. pressure superheated 200 deg. Fahr. The gases discharge through Green economisers, and the two chimneys are each 240 ft. high, with an internal diameter of 14 ft.

Coal is delivered in wagons from adjacent sidings to two elevated coal roads, the wagons discharging their contents into hoppers underneath, which feed two tray conveyors, these in turn delivering the fuel into two bucket conveyors which pass up the end of the building



Outline Map of Electric Lines of London and North Western Railway in London and Suburbs.

To indicate the Chalk Farm arrangements more clearly, it may be said that the down electric line from Euston is carried in tunnel from a point south of the old Primrose Hill tunnels under all the existing lines to Loudoun Road. The up electric line passes through a tunnel from Loudoun Road to the junction at Chalk Farm with the existing up slow line. The up fast line is carried over the slow lines on a fly-over bridge. An underground junction is provided with the electrified North London Railway at a point north of the junction of the new electric lines with the existing slow steam tracks.

The Power Station.

The railway company have provided a large power station at Stonebridge Park, about a mile to the west of Willesden Junction and approximately at the geographical centre of the electric lines, though no doubt the centre of load, when all are working, will be

and over the boiler-house bunkers, returning at practically the same level, as the ashes are removed by a separate pneumatic discharge plant in the basement delivering to two outside storage bins. A portion of the fuel discharged from the elevated coal roads can be stacked by means of an electric jib crane, provision being made for storing about 20,000 tons outside. The water required for the plant is obtained from two artesian wells, with compressed air lifts; this water is delivered to a large reservoir, over part of which a battery of eight wooden cooling towers has been erected. The same water is used for boiler-feed purposes after being passed through a softening plant.

The turbine room contains five 5,000-kw. Westinghouse-Siemens three-phase turbo-alternators delivering current at 11,000 volts and 25 cycles. An auxiliary low-voltage set is installed for driving auxiliary machinery and for lighting purposes; this consists of a tandem set, including a 500-kw. 440-volt alternator

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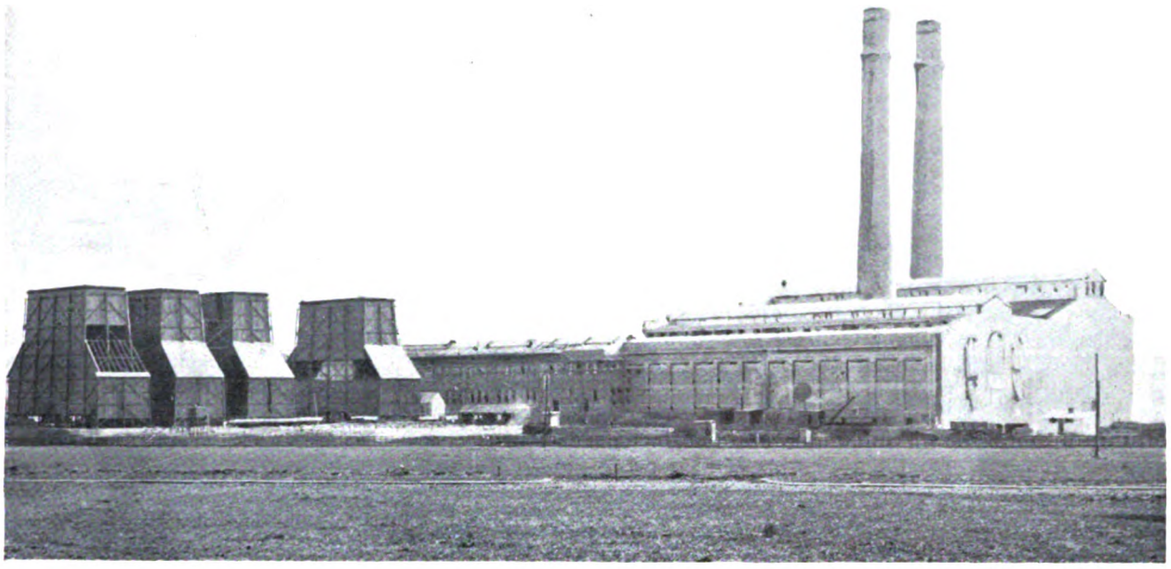
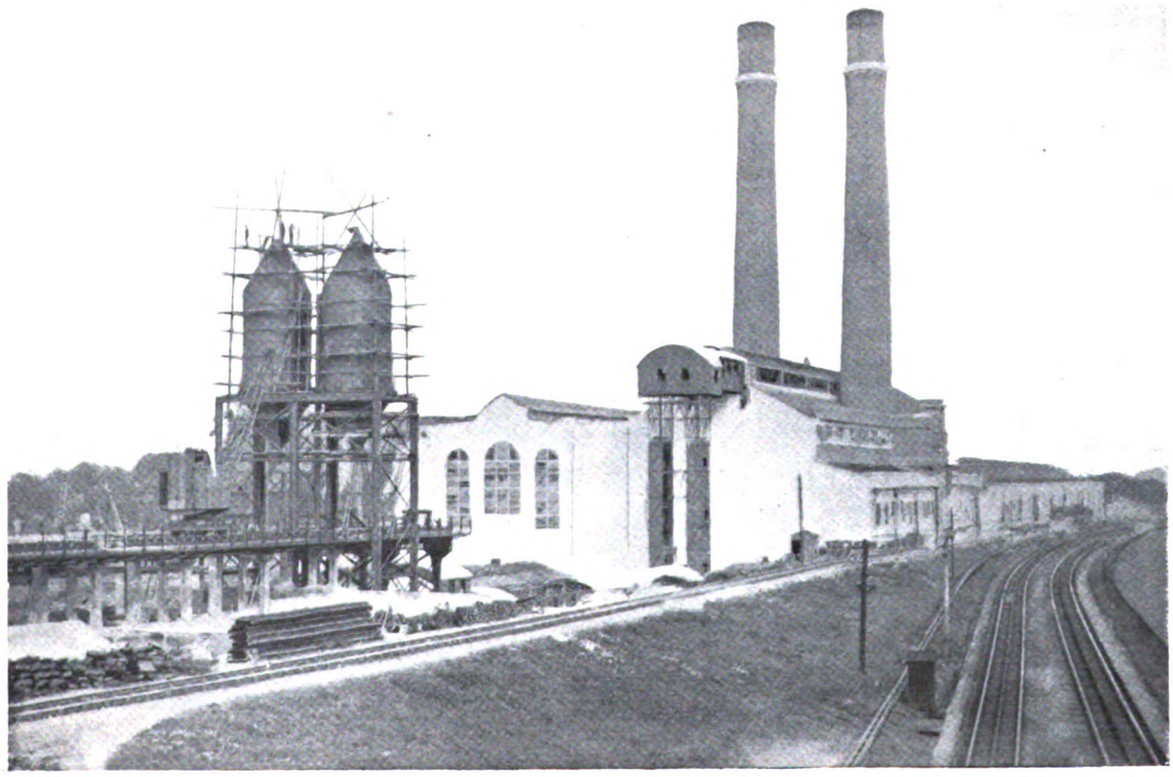


Power Station and Cooling Towers at Stonebridge Park.

and exciter, and a 120-KW. 220-volt direct-current machine. In the ordinary way the auxiliary a.c. station motors will be supplied through transformers from the main bus-bars, but when the large units are shut down the small set can be utilised, or for supplying through step-up transformers to the sub-stations.

THE SUB-STATIONS.

There are eleven sub-stations situated at Stonebridge Park, Bushey, Headstone Lane, Kenton, Willesden, Queen's Park, West End Lane, Dalston, Broad Street, Acton, and Chalk Farm. A standard equipment is provided, consisting in most cases of three rotary converters, of either 750 or 1,000-KW. capacity, nine single-phase static transformers of the Berry oil-cooled type, a storage battery and automatic reversible booster of the Entz type. The Chalk Farm sub-station is the old gas engine power station reconstructed; this plant has for some years supplied energy for lighting purposes to Euston Station, for which service three rotary converters are now employed, while for traction purposes three large rotary converters are being installed. The small generating unit at the main power station can be used to supply the current for lighting



Ash Receiver and South-West Face of Power Station at Stonebridge Park.

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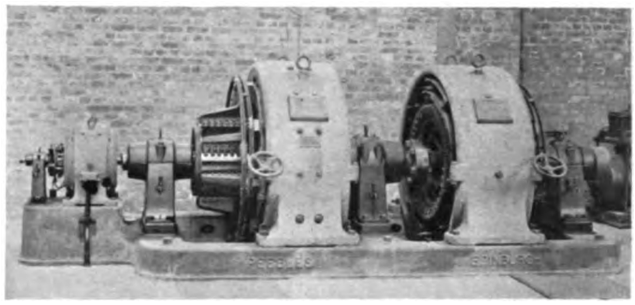
through this sub-station when the main units are shut down and the electric trains not running. The rotary converter equipment, including in all six 1,000-KW. and twenty-five 750-KW. rotary converters of the self-synchronising type, has been supplied by the British Thomson-Houston Company, who also supplied the main high tension switchgear at the power house.

The sub-station switchgear, both h.t. and l.t., has been provided by the British Westinghouse Company, with the exception of the booster and battery panels, which were supplied under Messrs. Bruce Peebles' contract and made by Messrs. Whipp and Bourne. The batteries are of Tudor Accumulator make, and the boosters supplied by Bruce Peebles and Company.

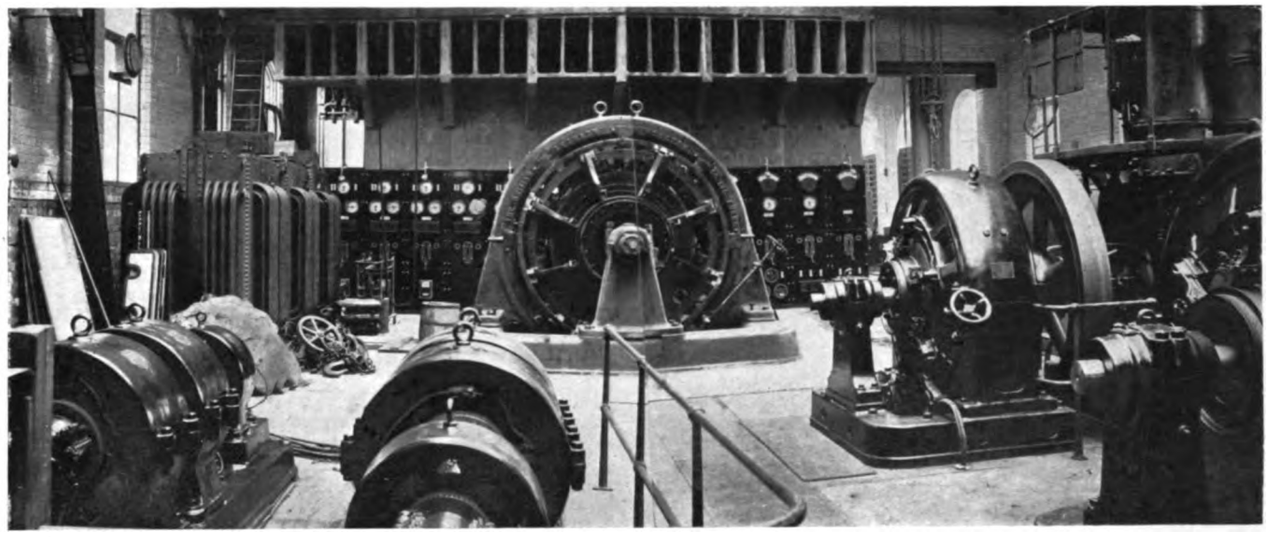
The high tension feeder cables, which are of the three-core, paper-insulated, lead-covered, and armoured type, were supplied by the British Insulated and Helsby Cables, Limited. The low tension feeder and jumper cables have been supplied by Messrs. W. T. Henleys Telegraph Works, Limited, and are mostly paper-insulated bitumen-sheathed cables. In some cases rubber-insulated bitumen-sheathed cables are used.

volts pressure, to supply the collecting shoes on the trains; a negative rail is provided between the running rails, and the latter may be used for track circuiting and automatic signalling. The conductor rails, of



Battery Booster Set.

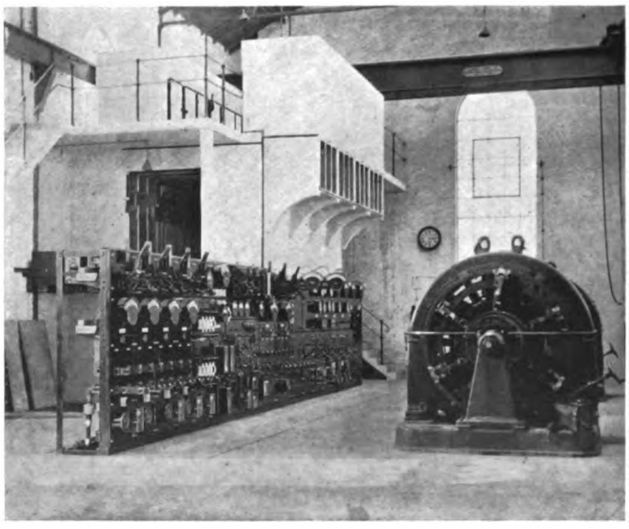
special low carbon steel, having about 6½ times the specific resistance of copper, weigh 105 lb. per yard, and are mounted on Doulton porcelain insulators, attached to the sleepers by malleable iron clips, while special



Chalk Farm Sub-station During Reconstruction and Before Removal of Gas Engines.

Track Equipment.

The electrical equipment of the tracks naturally conforms to that of the various connecting electric railways over which running powers are exercised. Outside positive conductor rails are employed, at about 600



Interior of Acton Sub-station.

anchor insulators are provided at intervals to prevent creeping of the rails. Each rail joint is bonded by four flexible strip bonds having a copper area of 1·4 sq. in.

The trailing ramps are of cast iron, and the leading ramps on through lines are of forged steel, and in some cases, as on sidings, of special cast steel. The jumper cables are laid solid in bitumenised-fibre troughing, and fitted with the Cortez-Leigh patent sealing terminal.

Rolling Stock.

The standard rolling stock comprises three-coach and six-coach trains, each three-coach train consisting of a motor coach, a trailer, and a driving trailer, with control on the multiple unit system. The electrical equipment of the first four trains (described in our issue of January 14, 1915) is by Siemens Brothers Dynamo Works, Limited, and for the remaining trains by the Oerlikon Company. The first four trains used on the Willesden-Earl's Court section were supplied by the Metropolitan Carriage, Wagon and Finance Company, and had Siemens equipments; the Metropolitan Carriage Company is also building the new standard motor coaches, while trailer and driving trailer coaches are being constructed at the London and North Western Railway Carriage Works at Wolverton. Each motor car is fitted with four motors of 260 H.P. each.

It will be noted from the drawings that both cross and longitudinal seats are used, and that the doors

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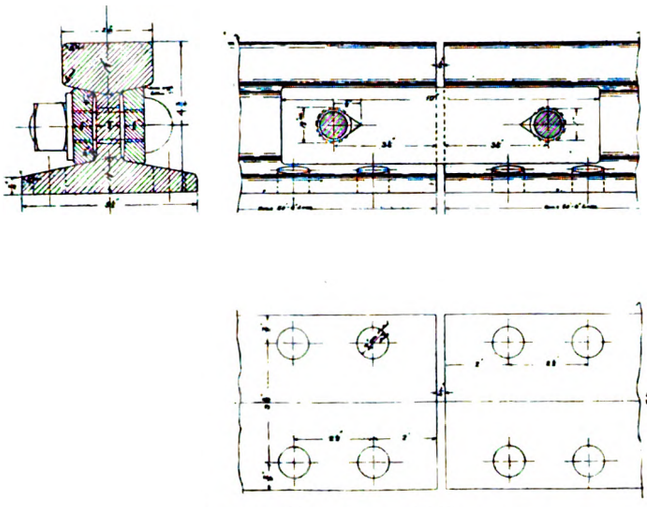
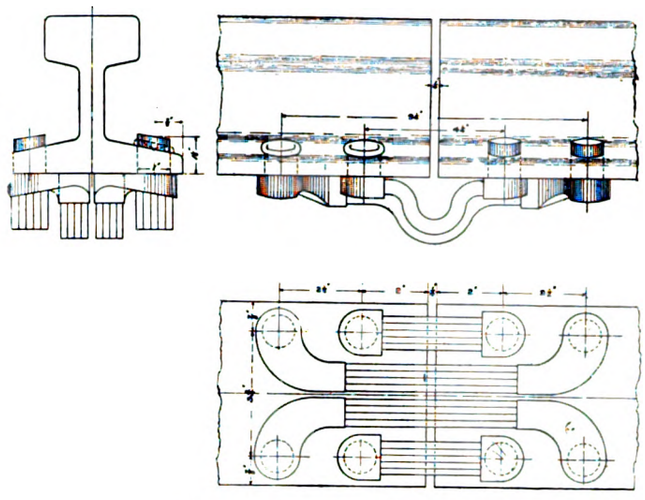
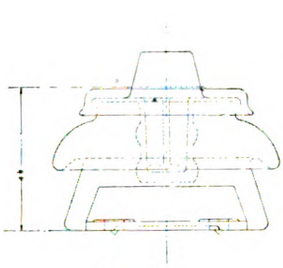


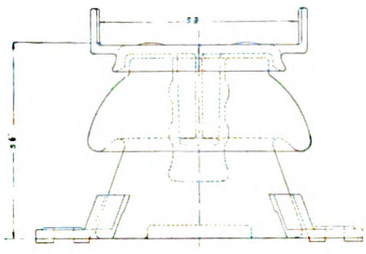
Detail of Conductor Rail.



Detail of Conductor Rail Bond.



Negative.



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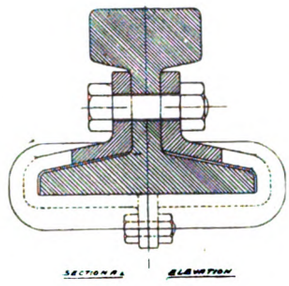
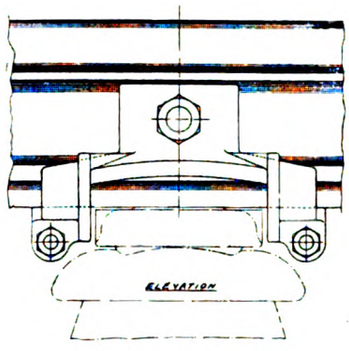
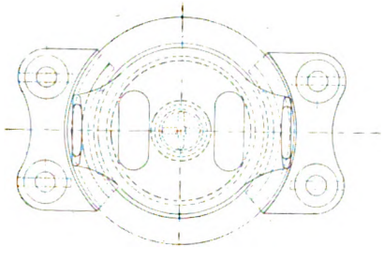
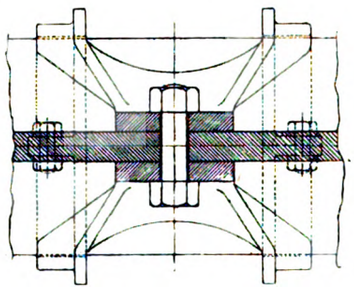




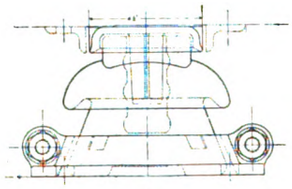


Conductor Rail Insulator.

Conductor Rail Clip for Anchor Insulator.



Cortez-Leigh Terminals.



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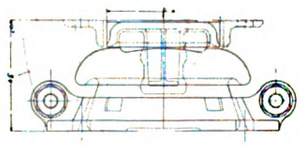
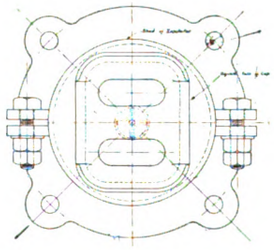
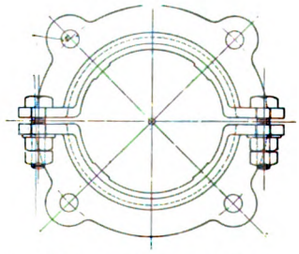


Negative.



Plan of Top.



Plan of Negative Clamping Ring.

Conductor Rail Anchor Insulators.

London and North Western Railway Electrification.

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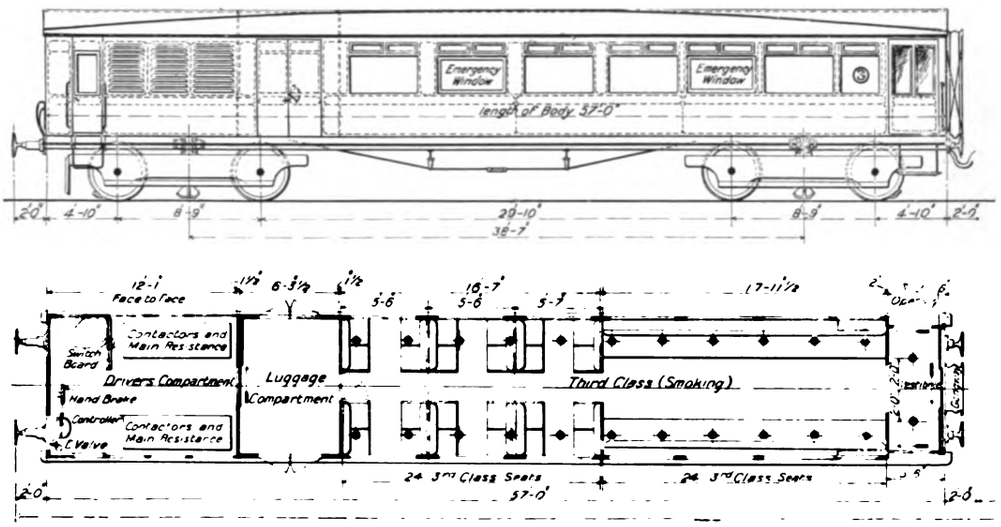
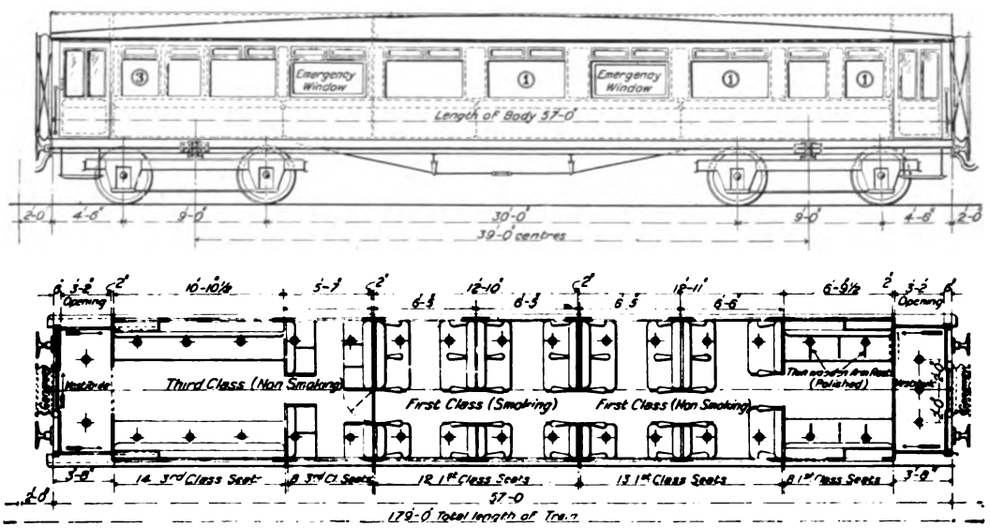
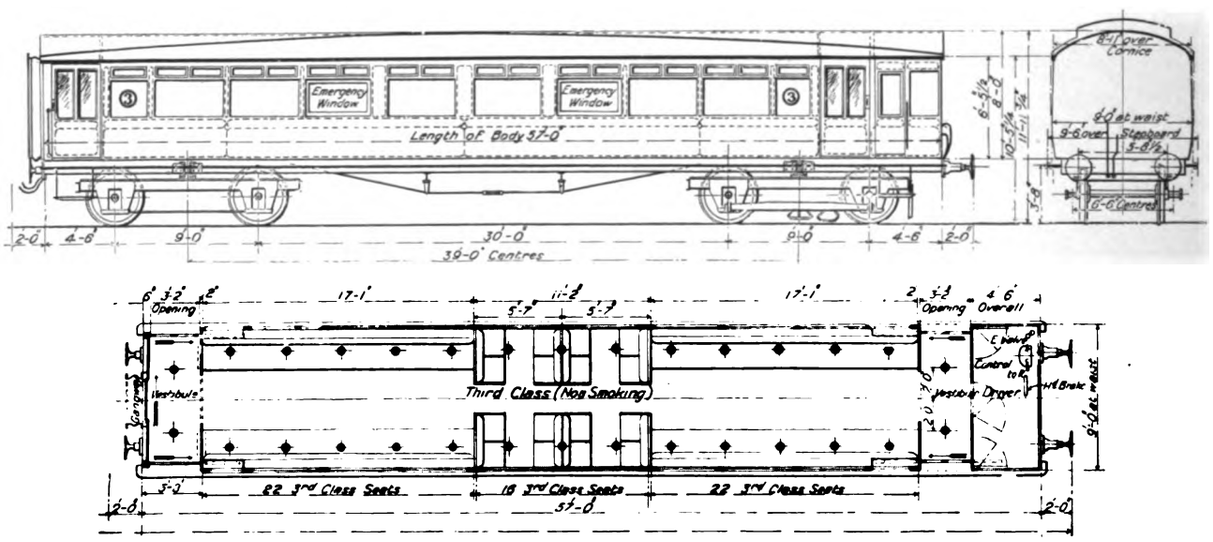


Elevation and Plan of Motor Car.



Elevation and Plan of Trailer Car (Middle Car of Three-Car Train).



Elevation and Plan of Driving Trailer Car.

Three-Car Electric Train—London and North Western Railway.

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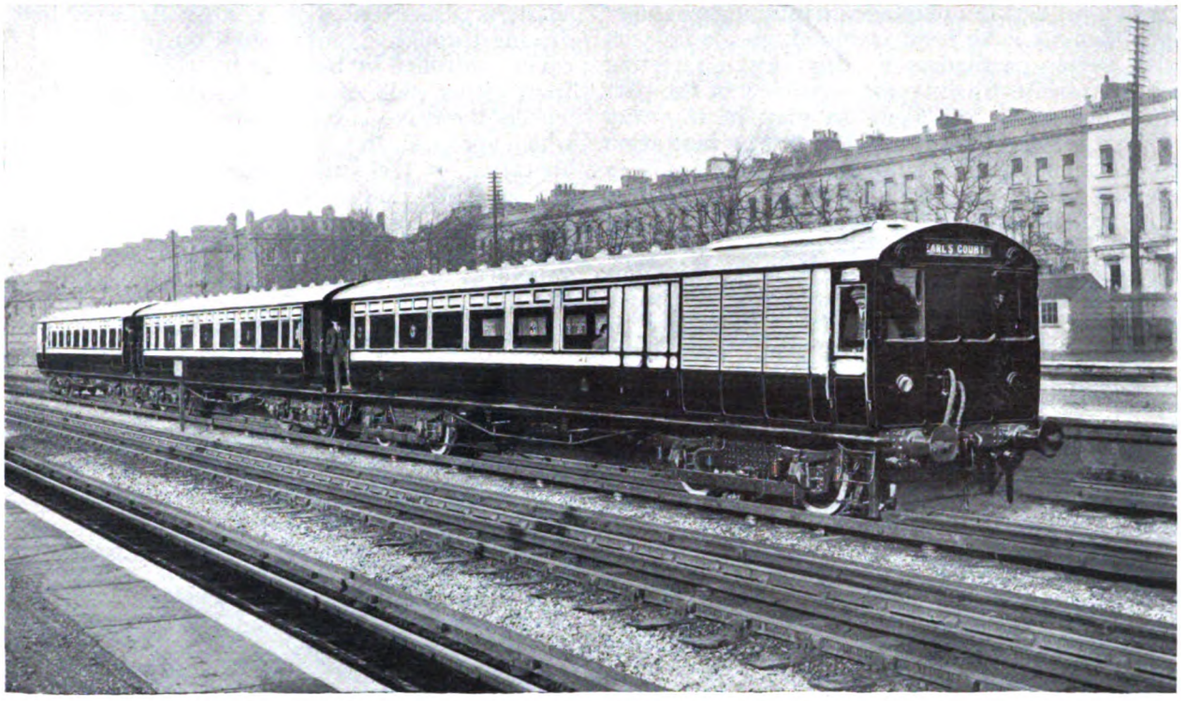
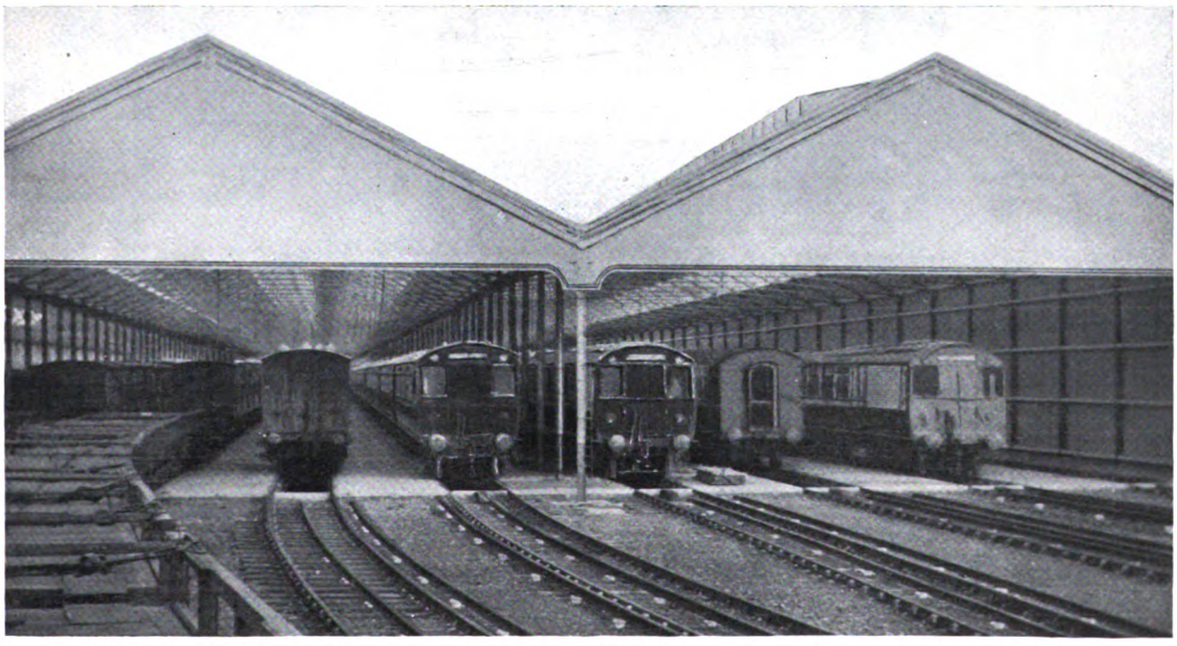
are at the ends. Two emergency windows on each side of the car give an additional means of exit in case of fire. The exterior of the body is covered with steel panelling, and the wood of the roof is treated so as to



Three-Car Electric Train—London and North Western Railway.

be non-inflammable. The floor is laid on corrugated troughing. The body length of each car is 57 ft., and the bogie wheel-bases and the distances between centres are :—Motor cars, 8 ft. 9 in. and 38 ft. 7 in.;



Electric Trains in Watford Car Shed—London and North Western Railway.

trailers and driving trailers, 9 ft. and 39 ft. The seating accommodation is :—Motor car, 48 ; trailer car, 55 ; driving trailer car, 60 ; total, 163.

The special joint stock for working on the Bakerloo-Watford services is being built by the Metropolitan Carriage, Wagon and Finance Company, and will have equipments made by the British Thomson-Houston Company. There are four 250 H.P. motors on each motor coach. As the platform level on the Bakerloo tube is lower than that at the main line stations, the special joint rolling stock, which will have to work over both systems, is a compromise between the London and North Western standard and the Bakerloo standard, so that passengers on this stock will step up to the platforms on the L. & N.W. line and down to the platforms on the Baker Street and Waterloo line.

In connection with the preparation of this article, we wish to express our indebtedness to Lieut.-Col. F. A. C. Leigh (T.D.), R.E., chief electrical engineer to the London and North Western Railway, who is responsible for the whole electrification scheme.

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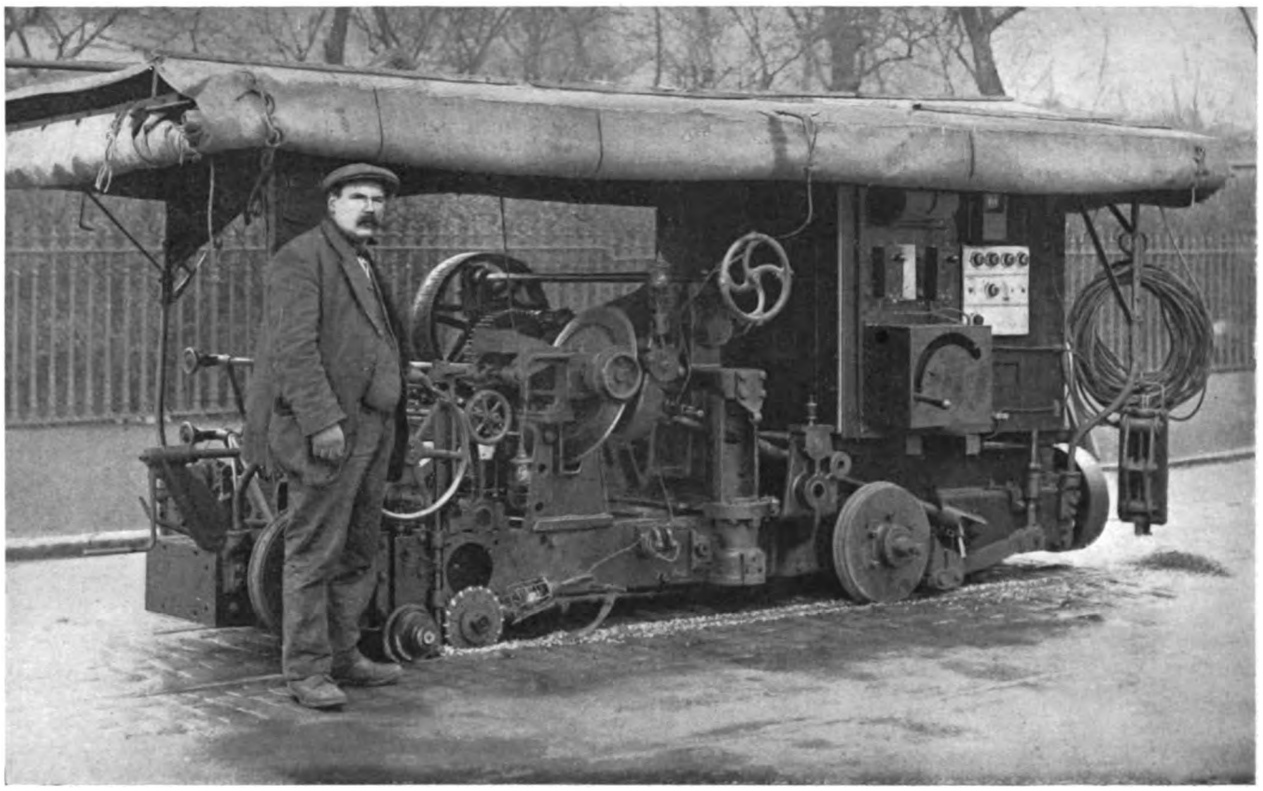
THE WOODS-GILBERT RAIL PLANER AND GRINDER.

Its Work at Bexley.

In our issue of October 12 a short notice was given of the Woods-Gilbert rail planing and grinding machine; and since then we have been favoured, as the lawyers say, with better particulars of this very interesting and useful means of track repair. In view of the part that these machines are likely to play in tramway maintenance in the near future, we have no hesitation in again reverting to the subject. As mentioned in the previous notice, one of the machines has been in operation on the Bexley tramways for some time, and Mr. H. P. Stokes, the electrical and tramway engineer of Bexley Urban District Council, who has thus had a good opportunity of watching the work of the machine and the value of its performance, is exceedingly well satisfied with the result. An illustration accompanying our earlier notice showed the apparatus being used as a rail grinder, and we now reproduce a photograph showing one of the machines at work deepening the groove of worn rails.



Woods-Gilbert Rail Machine at Work Deepening Groove of Worn Rail.

The machine in use on the Bexley tramways is the latest type of machine constructed by the Woods-Gilbert Rail Planer Company, and is thoroughly well designed so as readily and consistently to eliminate corrugations from rails regardless of vertical or lateral rail distortion and difference in elevation of the rails.

The machine is constructed of what might be termed the power unit and the working unit. The former is a substantially-built truck carrying a 60-H.P. motor connected with friction clutches, countershafts, etc., so as to provide an extremely mobile and flexible power unit. Current for the motor is obtained from the overhead trolley wires, and the motor is capable of propelling the machine to the point at which work is required at a speed up to 20 miles per hour in either direction.

The main power truck is mounted upon four track wheels provided with substantial bearings and springs, each pair of wheels being connected to the motor by silent chain drive. This provides the fast travelling gear. The motor, which is provided with an extended shaft, is also fitted with a large diameter belt pulley driving through a countershaft on to a pair of friction cones controlled by hand levers which may be operated from either side of the machine. From these cone wheels the drive is transmitted through worm gearing which propels the machine slowly during working operation, at the same time driving the working unit, i.e., grinding head or milling head as the case may be. The friction cones are very substantial in design, and provide both forward and reverse travel, giving perfect sweetness of action without any abnormal strain on the machine.

The power unit is further provided with four heavy road wheels for the purpose of side-tracking the machine, namely, removing it entirely from the tramway track on to the side of the road to allow tramway traffic to proceed. This is operated by chain drive on to massive spindles, which, on being rotated, bring the road wheels into contact with the road, taking the entire weight of the machine from the tramway track. When this operation is completed, the operating clutch is thrown over in the opposite direction, and the machine at once commences to side-track. The whole operation is capable of being performed in one minute. The machine can be side-tracked in either direction.

The working unit, which is either the grinding head or milling head as the case may be, is connected with the power unit by means of a pair of connecting links and a massive cantilever, pivoted so as to provide the necessary lift for removing the working unit entirely clear of the rail for fast travelling.

When the machine is travelling fast the interconnected links between the two units are locked together so that neither truck moves out of relation

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to the other. The working unit is divided into two halves, each of which is dovetailed into each other with a trunnion pin, so as to allow each side of the carriage to deal independently with the rail on which it is at work. By this means both vertical and lateral inequalities of the rail are automatically dealt with. The grinding wheels also have hand-operated vertical and lateral adjustments.

Resting upon rails to be dressed, and supporting thereon each of the two sections of the divided fore carriage, are four sets of multiple rollers. Each set has seven rollers fixed in staggered position, and by this means all possibility of reiterating the corrugated surface of the rail during the grinding operation is eliminated. The two individual halves of the truck provide substantial weight, so as to give an effective cut to the abrasive wheels.

Each rail can be treated independently or both together, the method of drive in each case being entirely free and independent of the other, and allowing all possible variations and adjustments which may be required. The milling head, which is attached for the purpose of deepening the grooves, cutting down projecting guard lip or other remodelling work on the rails, is operated in a similar manner to the grinding head. An indicator is provided in order that the depth of the cut and the dressing tool may be accurately regulated. This indicator is also provided in order that variations in the width of the track may be observed and lateral adjustments in the dressing tools effected accordingly. It is sometimes found desirable when milling rails, when the rail is loose and shows a tendency to vibrate, to increase the weight upon the rail in order effectively to carry out the work. This is readily provided for by operating the cantilever which, when depressed at its outer end, will by reason of the links between it and the carriage sections, cause additional pressure to be exerted upon the working carriage in addition to its own weight.

In the case of the grinding carriage, suspension chains are provided instead of links, as it is not necessary to exert the pressure above referred to when grinding.

It will be seen that the main features of this machine are :—

The provision of a separate working carriage built in two sections providing for universal adjustments. Each half of this carriage being driven independently, the utmost efficiency is obtained.

The method of connecting the working unit to the power unit provides ready means of lifting and locking into fixed position both carriages, so as to enable it to proceed rapidly to other points where work is required to be performed.

The ingenious method provided for side-tracking the machine enables it to work with the least possible loss of time under all conditions of traffic.

The capacity of the machine when surface grinding is approximately 12,000 lineal feet of single track per month ; for milling work approximately 9,000 lineal feet of single track per month. The work is usually carried out at night, so as to afford no interruption to traffic conditions. The machine will operate on a 4 ft. 8½ in. gauge, and can be adapted for other gauges.

The machine has now been in operation on the Bexley Council Tramways for approximately two months. There is still some work to be accomplished, after which a large contract is to be carried out at Bolton.

As mentioned in a previous issue, the company owning the patents for the Woods-Gilbert machine originated in Australia, and it has carried out very extensive contracts in Melbourne, Sydney, Brisbane, and Adelaide, whilst work has already been completed or is now in progress on the Oldham, Ashton and Hyde, Isle of Thanet, Cardiff, Wigan, and Bexley Tramways, other large contracts already being in hand.

Mr. J. W. Eunson, the chief engineer of the company, is at present in this country supervising the putting to work of new machines. The London address of the company is 2 and 3, Norfolk Street, Strand, W.C.

THE ZÜRICH TRAMWAYS.

The twentieth report of Zürich Municipal Tramway system, dealing with the period January-December, 1915, shows that war taking place across the adjacent frontier exercises almost as great an influence on the industrial concerns of a neutral neighbour as it would if State boundaries counted for nothing. Not only has the Zürich tramway system suffered from this cause in regard to loss of traffic, but the expenses have also been increased owing to workers being called up to maintain the armed neutrality of their State. Both substitutes and men must still be paid whole or part wages, the outlay on the regular employees thus called up representing an expenditure of not less than 1·77 centimes per car kilometre. The total route mileage of the tramways is only 39 kilometres (24 miles), and the total track length 84¾ kilometres (51 miles), so that the system is not very large in comparison with the careful completeness of the organisation shown by the report throughout all its aspects. One interesting feature of the system consists of the electric point shifters, 29 in number ; of these 23 are fitted in cast-iron boxes under street level, and six in small street boxes above ground. The maintenance of these during the year cost frs. 1,817 (£75). The number of employes amounts to 886, and, as is the case with many of the continental tramway undertakings, the material welfare of the staff is closely considered by the provision not only of suitable working conditions, but also in the building of excellent blocks of flats and houses where they can live in comfort at a cheap rate, whilst the enterprise itself brings in a small return on the capital outlay over the sinking fund payments.

The car kilometres run during the year amounted to 9,299,380 ; total passengers carried were 35,451,080, so that the passengers per kilometre were 3·81, which shows a considerable reduction on the previous year's working. Total traffic receipts were 4,135,190 francs, or 11·66 centimes per passenger and 44·47 centimes per car kilometre. Gross receipts amounted to 4,217,001 francs. The rolling stock at the end of the year included 218 motor and 63 trail cars ; current consumption averaged ·823 KW. hour per car kilometre, and total consumption for the year 7,054,180 KW. hours, the cost per car kilometre for current averaging 8·2 centimes. Current is obtained from the municipal electricity works.

Working expenses rose to 83·49 per cent. of the receipts, as compared with 82·87 per cent. during the previous year, this increase being almost entirely owing to the extra cost of labour and part wages paid to members of the staff called up to the colours.

Per car kilometre the figures are :—Gross receipts, 11·89 centimes ; working expenses, 10·75 ; but as the sinking fund payments amount to 2·11 centimes in addition, the present exceptional conditions of working entail a debit balance, even irrespective of pension fund contribution or special reserves for amortisation of old capital. There seems no doubt, however, that conditions will revert to normal on the termination of the war, so as to show the same steady progress as was made in previous years.

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LONDON, NOVEMBER 9, 1916.

The Overhead Electric System.

The whirligig of time brings about changes, and this is true of the overhead wire system of electric traction as of many other things. The remark is suggested by two recent items of information in regard to Melbourne. One is that the Ministry of Munitions have allowed arrangements to be made to accelerate the delivery of electric plant for the electrification of the Melbourne Suburban Railways. These lines, it may be recalled, are to be equipped on the overhead wire system, high-tension direct current being used. The other point is that Melbourne City Council have asked the Victorian Government in case it is decided to electrify the cable tramways, to provide for placing the electrical equipment underground. That means the conduit system. In Edinburgh, where the comparative merits of various forms of traction are now much discussed, many people take the same view. Now in the history of electric tramways, but for a few exceptional cases, the trolley wire method has almost from the first had it all its own way. In the case of electric railways, however, the third-rail conductor, corresponding roughly to the tramway conduit conductor, was for years the only method in use. The perfectly good reasons for the diversity of practice in the two cases are well known. Of late, however, we have had many electric railways equipped with overhead wires, and this where single-phase alternating current or direct current is employed. If Melbourne adopts the conduit system for the tramways, it will possess the same peculiar feature as is to be seen in South London—namely, tramways on the conduit system and railways using the overhead wire. Till within recent years the arrangement in most places was just the reverse. We had trolley-wire tramways and third-rail conductor railways. The overhead wire will, it may safely be prophesied, be retained for tramways generally, and as railway electrification extends further afield the aerial conductor will be increasingly used on railways.

Halfpenny Fares.

An interesting aspect of the question of halfpenny fares has arisen in the eastern outskirts of the metropolis. In consequence of motor omnibus competition the revenues of a number of the smaller tramway undertakings showed a serious falling off before the war, and the financial position became somewhat alarming. In the earlier days of the war that position did not improve much, and a strong movement arose among the local authorities concerned for the abolition of halfpenny fares. In some instances such abolition was determined upon. Then the Councils of Leyton, Ilford, East Ham and West Ham perceived that if the minimum fare was to be raised to a penny, it would be necessary to get London County Council to adopt the same course so far as through cars were concerned, there being mutual through running between the systems. A conference was to have been held with the London County Council, but owing to the summer recess it was put off, and now it appears that it may never be held. Some of the Councils, finding that their tramway receipts have much improved lately, now propose to continue the halfpenny fares. In any event it would have been very difficult to have persuaded the County Council to make the minimum fare a penny, because to be consistent that course would have also to be adopted over the whole of the tramways in the county of London, and there is a strong element in the County Council opposed to such a course, despite the poor financial

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position of their huge undertaking. On the other hand, it would be a very questionable policy for the eastern Councils to drop the halfpenny fare question altogether. After the war omnibus competition will no doubt come into full swing again. The omnibus company will probably get some of their vehicles back from the Continent. In any case they will then be in a position to build rapidly as many vehicles as they wish. The abnormal passenger traffic in munition workers will fall away. All the local authorities concerned, including the County Council, should look to the future and be prepared for peace conditions which may involve trade depression. While it may be inadvisable to abolish halfpenny fares, there is much to be said in favour of a reduction in the length of the halfpenny stages. When these minimum fares were established years ago, the idea was to give about half a mile for a halfpenny. The stage has since been lengthened, till now it is often nearly a mile. A reversion to the rule of not more than half a mile for a halfpenny would probably have a considerable effect in increasing revenue. It has the merit also of being easily carried out and of being easily abandoned if found undesirable. Certainly none of these tramway undertakings are in such a financial position that they can afford to neglect any means of improving it.

Rail Traction in the War.

Surprise was expressed in the President's address at the Municipal Tramways Conference that, beyond the call for the transport of munition workers at home, the Government had not invoked the assistance of electric traction undertakings. The blame for the shortcoming may be attributed to both parties. By the nature of their work military directors are called upon to make provision for contingencies, but in the early stage of the present conflict their efforts in that direction have not in some respects proved adequate. The most notable inadequacy related to the provision of guns of various types and ammunition. To make good these deficiencies the whole engineering talent of the nation has now been successfully applied, and in that work a number of tramway undertakings have shared. The knowledge of what has had to be done to make good the shortage of munitions ought to have suggested the more extensive use of light railways, not only during the period of trench warfare but during the advance of the past four months in particular. No doubt it is due to the existence of national service in France that our ally has utilised light railways to an extent that far and away surpasses our efforts in those directions. Invaluable as road motor vehicles are, periods arise in war just as in ordinary traffic when the rail conveyance must be resorted to if due regard is to be paid to speedy and economical working, apart from the cost of road maintenance and the use for that purpose of labour that might be employed in other directions. In the three theatres of war in which our troops are employed in the East the nature of the terrain has enforced the use of light railways, in the construction and working of which the special companies of men enlisted from British and Colonial railways have found use for their activities. In France their duty until now has mainly related to the working and repair of existing French steam railways. The shortcoming has been at the War Office, where until the Minister of Munitions took up the vacant Secretaryship of State, and appointed his munitions deputy to a new post as inspector-general of transportation, nobody was charged with the study of means of transit in general. As was only to be expected, Sir Eric Geddes's activities have since been transferred to the staff of the British Commander-in-Chief in France. Another encouraging sign is that he has been accompanied by Mr. Maybury, the engineer and manager of the Road Board, whose enterprise has found scope during the past four years in many parts of the country. The ex-deputy general manager of the North Eastern Railway brings to his duties as inspector-general of transportation a knowledge of railway work ranging from a steam tramway in India and the speedy methods of construction on Canadian railways to electric traction on the North Eastern Railway.

A Light to be Carried with Cattle.—Attention was directed in our issue of October 7 to the danger placed in the way of all forms of road traffic through animals being allowed to be driven at night without anything to indicate their presence. On October 18 the Home Secretary issued an order under the Defence of the Realm Act, to come into operation on the 22nd inst., under which a lamp showing a white light to the front and rear must be carried at the rear of the animal, herd, or drove. If there are more than twenty cattle or more than 100 sheep, lambs, goats, kids, or swine, a second lamp must be provided to be carried in front.

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LONDON, NOVEMBER 9, 1916.

The Overhead Electric System.

The whirligig of time brings about changes, and this is true of the overhead wire system of electric traction as of many other things. The remark is suggested by two recent items of information in regard to Melbourne. One is that the Ministry of Munitions have allowed arrangements to be made to accelerate the delivery of electric plant for the electrification of the Melbourne Suburban Railways. These lines, it may be recalled, are to be equipped on the overhead wire system, high-tension direct current being used. The other point is that Melbourne City Council have asked the Victorian Government in case it is decided to electrify the cable tramways, to provide for placing the electrical equipment underground. That means the conduit system. In Edinburgh, where the comparative merits of various forms of traction are now much discussed, many people take the same view. Now in the history of electric tramways, but for a few exceptional cases, the trolley wire method has almost from the first had it all its own way. In the case of electric railways, however, the third-rail conductor, corresponding roughly to the tramway conduit conductor, was for years the only method in use. The perfectly good reasons for the diversity of practice in the two cases are well known. Of late, however, we have had many electric railways equipped with overhead wires, and this where single-phase alternating current or direct current is employed. If Melbourne adopts the conduit system for the tramways, it will possess the same peculiar feature as is to be seen in South London —namely, tramways on the conduit system and railways using the overhead wire. Till within recent years the arrangement in most places was just the reverse. We had trolley-wire tramways and third-rail conductor railways. The overhead wire will, it may safely be prophesied, be retained for tramways generally, and as railway electrification extends further afield the aerial conductor will be increasingly used on railways.

Halfpenny Fares.

An interesting aspect of the question of halfpenny fares has arisen in the eastern outskirts of the metropolis. In consequence of motor omnibus competition the revenues of a number of the smaller tramway undertakings showed a serious falling off before the war, and the financial position became somewhat alarming. In the earlier days of the war that position did not improve much, and a strong movement arose among the local authorities concerned for the abolition of halfpenny fares. In some instances such abolition was determined upon. Then the Councils of Leyton, Ilford, East Ham and West Ham perceived that if the minimum fare was to be raised to a penny, it would be necessary to get London County Council to adopt the same course so far as through cars were concerned, there being mutual through running between the systems. A conference was to have been held with the London County Council, but owing to the summer recess it was put off, and now it appears that it may never be held. Some of the Councils, finding that their tramway receipts have much improved lately, now propose to continue the halfpenny fares. In any event it would have been very difficult to have persuaded the County Council to make the minimum fare a penny, because to be consistent that course would have also to be adopted over the whole of the tramways in the county of London, and there is a strong element in the County Council opposed to such a course, despite the poor financial

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position of their huge undertaking. On the other hand, it would be a very questionable policy for the eastern Councils to drop the halfpenny fare question altogether. After the war omnibus competition will no doubt come into full swing again. The omnibus company will probably get some of their vehicles back from the Continent. In any case they will then be in a position to build rapidly as many vehicles as they wish. The abnormal passenger traffic in munition workers will fall away. All the local authorities concerned, including the County Council, should look to the future and be prepared for peace conditions which may involve trade depression. While it may be inadvisable to abolish halfpenny fares, there is much to be said in favour of a reduction in the length of the halfpenny stages. When these minimum fares were established years ago, the idea was to give about half a mile for a halfpenny. The stage has since been lengthened, till now it is often nearly a mile. A reversion to the rule of not more than half a mile for a halfpenny would probably have a considerable effect in increasing revenue. It has the merit also of being easily carried out and of being easily abandoned if found undesirable. Certainly none of these tramway undertakings are in such a financial position that they can afford to neglect any means of improving it.

Rail Traction in the War.

Surprise was expressed in the President's address at the Municipal Tramways Conference that, beyond the call for the transport of munition workers at home, the Government had not invoked the assistance of electric traction undertakings. The blame for the shortcoming may be attributed to both parties. By the nature of their work military directors are called upon to make provision for contingencies, but in the early stage of the present conflict their efforts in that direction have not in some respects proved adequate. The most notable inadequacy related to the provision of guns of various types and ammunition. To make good these deficiencies the whole engineering talent of the nation has now been successfully applied, and in that work a number of tramway undertakings have shared. The knowledge of what has had to be done to make good the shortage of munitions ought to have suggested the more extensive use of light railways, not only during the period of trench warfare but during the advance of the past four months in particular. No doubt it is due to the existence of national service in France that our ally has utilised light railways to an extent that far and away surpasses our efforts in those directions. Invaluable as road motor vehicles are, periods arise in war just as in ordinary traffic when the rail conveyance must be resorted to if due regard is to be paid to speedy and economical working, apart from the cost of road maintenance and the use for that purpose of labour that might be employed in other directions. In the three theatres of war in which our troops are employed in the East the nature of the terrain has enforced the use of light railways, in the construction and working of which the special companies of men enlisted from British and Colonial railways have found use for their activities. In France their duty until now has mainly related to the working and repair of existing French steam railways. The shortcoming has been at the War Office, where until the Minister of Munitions took up the vacant Secretaryship of State, and appointed his munitions deputy to a new post as inspector-general of transportation, nobody was charged with the study of means of transit in general. As was only to be expected, Sir Eric Geddes's activities have since been transferred to the staff of the British Commander-in-Chief in France. Another encouraging sign is that he has been accompanied by Mr. Maybury, the engineer and manager of the Road Board, whose enterprise has found scope during the past four years in many parts of the country. The ex-deputy general manager of the North Eastern Railway brings to his duties as inspector-general of transportation a knowledge of railway work ranging from a steam tramway in India and the speedy methods of construction on Canadian railways to electric traction on the North Eastern Railway.

A Light to be Carried with Cattle.—Attention was directed in our issue of October 7 to the danger placed in the way of all forms of road traffic through animals being allowed to be driven at night without anything to indicate their presence. On October 18 the Home Secretary issued an order under the Defence of the Realm Act, to come into operation on the 22nd inst., under which a lamp showing a white light to the front and rear must be carried at the rear of the animal, herd, or drove. If there are more than twenty cattle or more than 100 sheep, lambs, goats, kids, or swine, a second lamp must be provided to be carried in front.

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TRADE AFTER THE WAR.

The Government still lag far behind public opinion as regards the carrying out of the resolutions of the Paris Conference. It is true, unfortunately, that the end of the war is not in sight, but unless the Government show more resolution than they usually do the war will come to an end before this country is prepared for the situation that will then arise. It has to be remembered that not only have the Government to settle their own detailed scheme of procedure, but after it has been provisionally settled conference with the Allies should follow, so that there may be as little clashing as possible between the trade policies of the allied countries. Compromise and modification may be necessary all round. That will take more time. But so far as is known the Government are not pushing ahead in the matter; they are simply awaiting the reports of the various committees which they have set up. Evidently they do not anticipate making any speedy move, for in the middle of October the Board of Trade appointed still another Committee—this time to deal with the non-ferrous metal trades. A few public announcements were made in the earlier part of October. Let us see what they amount to.

Mr. Bonar Law stated in reply to a question in the House of Commons that the expert Committees appointed to advise the Board of Trade as to the steps to be taken to secure the possession of various important trades after the war had made considerable progress with their investigations. He also referred to the well-known fact that a General Committee had been set up under the chairmanship of Lord Balfour of Burleigh to report on British commercial policy after the war. It had been arranged that the conference of technical delegates to consider the laws relating to industrial property should meet at an early date. The question of introducing legislation to prevent the dumping of German goods had not yet been considered. The pious hope was added that Lord Balfour's Committee anticipated being able to report within a moderate space of time.

To those who appreciate the importance of prompt action this statement is not very encouraging. What is wanted is an assurance that the Government are taking effective steps to induce the Committees to expedite their work, and not unnecessarily to broaden their inquiries. Some steps towards the general end in view can be taken without legislation, among which is the improvement of administrative machinery. One step of the kind lately accomplished is the combination of the Commercial Intelligence Branch of the Exhibitions Branch of the Board of Trade in a new and enlarged Commercial Intelligence Department.

Lord Balfour's General Committee are moving, however, and they are evidently utilising the expert Committees already referred to. It is reported that the former, in pursuance of their object to advise the Government as to the best method of carrying out the Paris Conference resolutions, asked the Iron and Steel Committee for observations and suggestions. The Iron and Steel Committee thereupon sent in a memorandum on the problem how to restore to the iron and steel industries of the country the position they have temporarily lost by reason of their conversion into instruments for the manufacture of munitions of war. The Iron and Steel Committee recommended the prohibition of all imports of iron and steel manufactures from enemy countries during the period of reconstruction, and considered that the Government should urge the adoption of a similar policy on the Dominions and other parts of the Empire. All the ores and minerals necessary for the manufacture are to be admitted free, but only in their natural and unworked state; and these raw materials, whenever produced in the Empire, should be prevented from entering enemy countries. It was further recommended that British ships should be prevented from carrying raw materials or manufactured iron and steel from neutral ports to enemy countries or to neutral ports for ultimate despatch to those countries. The Committee also suggested the setting up of a body representing the industries concerned, which should have power to issue licences in exceptional cases.

These things give an idea of movement, slow, perhaps, but still in the right direction. But what is to be inferred from the fact that at this time of day on October 20 to be precise—the Board of Trade appointed another Committee? This body is to consider the position after the war, especially in relation to international competition, of the non-ferrous metal trades, and to report what measures are necessary to safeguard that position. Sir Gerard Muntz is the chairman. It is now a long time since the other Board of Trade Committees on various industries were appointed. Why was this one not appointed sooner, and is it expected so to speed up its proceedings that it will be able to report about the same time as the others? Again, as on some previous occasions, arises the danger of overlapping and waste of effort. For some months there has been in existence a Committee appointed by the Advisory Council on the organisation and development of scientific and industrial research dealing with metallurgy, and the section of it relating to the non-ferrous metals has Sir G. Muntz as a member. Of course scientific and industrial research can be kept distinct from purely trade questions, but unless care is taken, and a proper delimitation agreed on between the two Committees, there may be serious overlapping. To the observer the whole business of endless Committees seems a hopeless tangle. The straightening out, co-ordination, and general scheme for definite action—if they are to be achieved at all—should apparently rest on the one hand with the Advisory Council so far as scientific research is concerned, and with Lord Balfour's Committee in respect to trade questions. The conclusions reached by each of these should then be co-ordinated and one great scheme evolved. Who is to carry out that last step is not clear. The politicians composing the Cabinet clearly are unfitted for the task. Delegates from the Advisory Council and Lord Balfour's Committee would probably constitute the best body. The final struggle will be to get the Government to adopt the scheme and take definite and vigorous action.

SUMMER TIME ACT: LIVES SAVED.

The Summer Time Act Committee (Mr. J. W. Wilson, M.P., chairman) have already held some preliminary meetings, as the result of which much statistical information has been compiled. When this has been collated the evidence of experts will be recorded.

At inquests held on three persons who had been killed in the streets by motor vehicles, the Westminster coroner said, on October 27, that on turning to his records he had discovered a very interesting fact with reference to the Summer Time Act. From May 15 to October 1 of the present year he only held 26 inquests on the bodies of persons killed by vehicles, while there were 57 for the corresponding period of last year.

One hundred and one fewer accidents were recorded in the City of London during the quarter ended September 25. The total number of accidents was 220, as compared with 321 in the corresponding period of last year. Fatalities numbered three as against four. The accidents are allocated as follows:—Tramcars, 3; motor cars, 58; motor omnibuses, 34; motor cycles, 5; ordinary cycles, 18; horse drawn vehicles, 102.

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UTILISATION OF TRAMWAYS FOR GOODS TRAFFIC.

To the Editor of The Tramway and Railway World.

Sir,—In the discussion on "Utilisation of Tramways for Goods Traffic"—a paper which I have read with much interest—Mr. Hamilton says, "I suggest that tramway undertakers who are considering this question or may have to consider it in the near future, ought to see that their powers are brought into line with what I think will be found the necessary practice." The only addition I should suggest to such a practical statement is, that undertakers, whether company or municipal, should meet and discuss what further powers are necessary, and instead of any one undertaker taking the burden upon himself alone in any application to Parliament, he should be assisted by the industry, not only to frame model clauses dealing with the question, but with the strongest evidence obtainable to support them.

I think the paper and the discussion that followed show that so far as municipal minds are interested, the carriage of goods by tramways would be of advantage and also possible, but that as yet there were many defects, largely legislative, which would have to be amended before success could be secured.

The authors do not state whether they are in agreement with the late Mr. Bellamy when they quote him as saying this business has been ignored under company control; if they are, I would like to suggest that company-owned concerns had long ago arrived at conclusions somewhat similar to those put forward at the conference. It would appear, therefore, that municipal undertakings have not advanced in this direction beyond what was known in the eighties. A very bold attempt was made to deal with this traffic in South Staffordshire, and a tramway was built between Wolverton and Stony Stratford to carry every description of goods traffic as well as passengers. This tramway not only dealt with station-to-station traffic but also cartage and delivery, which was much more complicated, and it was only the financial side of the question which, after two years' working, led to the discontinuance thereof. This was mainly due to the rates then in force and the ungenerous attitude of the railway company.

The attempts at Leeds, Huddersfield, Burnley, and other towns only touch the fringe of the business and in no way solve the problem. I hope some more light will be thrown upon the subject in Mr. Hamilton's promised report.

Absence of co-ordination and unity in interests common to all appear very marked in municipal undertakings. Company managers and directors are as white as those who control municipal industries; both have interests in common, and the petty jealousies that exist are neither creditable nor conducive to the interests of the industry.

Municipal authorities and companies may have differences; so have Corporations when they try to annex one another; so have railway companies. Yet there is only one municipal association and one railway association. Where then is the necessity for two tramways associations?

Every tramway should have the power to carry goods. We know that many (including light railways) have not, some having failed to obtain them in consequence of the opposition of municipal authorities. Others failed owing to the opposition of railway companies who, quoting precedents obtained by the municipal authority, added their true objection, viz., competition.

Now, such unfortunate conditions would not exist if the personal element disappeared and the interests of the industry predominated. If the carriage of goods is to be a source of revenue to a tramway undertaking as well as a public advantage, it should be exercised to its utmost, and combined action should be taken to secure it by model clauses to be embodied in the model bill. It will be seen how important this is, because each tramway which is receiving goods from another tramway must have similar powers, and that is why I took my text at the commencement from the Gospel according to Hamilton.

I think the general consensus of opinion is that goods can be dealt with by tramways; to what extent is a matter of experience.

The first people to tackle are the railway companies, who should be required to give the same facilities for collection and delivery of goods as are afforded to every cartage contractor using either horse, steam, or petrol; power to make sidings to railway depots and goods yards should be made compulsory in default of an agreement being entered into.

Secondly, a tramway should, for purposes of goods traffic, be deemed to be a railway. The result of being brought into the definition of a railway, with a railway connection, is so obvious from the financial point of view that I need not labour it.

Thirdly, a revised schedule of rates, the existing schedules being unsuitable. I am in favour of no schedule. Protection in this respect is probably necessary when you are dependent on a statutory monopoly, but a public highway is open to all and sundry, and thus a healthy competition is induced for the benefit of all.

The power to make sidings into any depot or warehouse other than those belonging to the undertaker does not exist under the general law. The authors are quite correct and Mr. Mozley is wrong. That the undertakers should have this power is obvious. Mr. Edwards in his paper says that generally to make these sidings would not pay. He may be right; no one would put them in if the traffic did not justify the expenditure, but there must undoubtedly be many cases where they would pay and be most useful.

It may be of interest to mention that I have in one or two cases obtained these general powers in the Special Act.

The regulations as regards trailers must be altered. It is difficult to appreciate why an electric motor on rails should not draw trailers, when it is done everywhere on roads to-day by steam or petrol.

I conclude by expressing the hope that in the welfare of an industry in which we are all concerned—many of us a life's interest—all will recognise the folly of a house being divided against itself.

I am, sir,

Yours faithfully,

Stephen Sellon.

36, Victoria Street, London, S.W.
26th October, 1916.

DEPARTMENT OF COMMERCIAL INTELLIGENCE.

The Board of Trade announce that with a view to improving the organisation for assisting British trade by collecting commercial information, the President of the Board of Trade has decided to amalgamate the Commercial Intelligence branch and the Exhibitions branch of the Board, and has appointed Sir William Clark, K.C.S.I., C.M.G., to be comptroller-general of the combined department, which will be known as the Department of Commercial Intelligence. Mr. T. Worthington, who has retired from the post of director of the Commercial Intelligence branch under the age limit, will assist the department in a consultative capacity as commercial adviser.

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CHARING CROSS BRIDGE AND SOUTH EASTERN RAILWAY IMPROVEMENTS.

By A. J. Lawson, M.Inst.C.E.

The removal of the present railway bridge and the construction of a great roadway and bridge for vehicular and passenger traffic at Charing Cross has been for several years an obvious improvement to be seriously undertaken at the first favourable opportunity. The series of articles by Mr. John Burns, Sir Aston Webb, and Mr. Blomfield, which have lately appeared in the *Observer*, are therefore opportune, but the sketch plan of the suggested works is most decidedly open to many objections, especially the proposed site for the new station and the too-far eastward swing of the line of the bridge and the new road on the Surrey side of the river.

It is hardly to be expected that the South Western Railway Company, which is now carrying out at very great cost the much-needed scheme of reconstruction of its terminal station at Waterloo, will consent to the "blanketing" (to use a well-known yachting expression) of their new station by a new South Eastern station, and its wider lines of approach across Waterloo Road and York Road. The mere attempt to do so would lead to a very strenuous and costly fight in the Parliamentary Committee-rooms, the expense of which, if saved, would go far towards paying for a great part of the needed improvement in the immediate neighbourhood of the termini of both railways.

The proposed South Eastern terminus would, besides, be approached by a "bottle neck" inlet and outlet which would seriously obstruct the working of the railway, similar to that which has retarded for half a century the proper development of the South Western, and has been so very costly to partially overcome. Nor is such an approach at all necessary while the opposition of the South Western Company can be wholly overcome by a simple plan which would cost the South Eastern Railway a much less capital expenditure.

Any large scale map of the district will show that the property on the eastern side of Waterloo Road from the New Cut to Stamford Street is of a poor class and of smaller value than the property which is set apart on the sketch map that appeared in the *Observer* for the proposed station. Moreover, the South Eastern Railway now passes through this property, so that it would only require the erection of a terminal station with suitable facade and entrances in Waterloo Road, and the construction of the necessary lines and platforms to make the site available within a fraction of the time that would be required to clear and build the riverside site to which, as already stated, access would only be possible by a narrow bottle neck approach over Waterloo Road and York Road in front of the South Western Railway Station approaches and buildings.

By the adoption of the Waterloo Road site not only would the approaches to both stations be open and unobstructed, but the present and any future unsightly viaducts over the Waterloo and York Roads could be entirely dispensed with. A finer approach would be given to the new river bridge, the road to which would start from between the two new railway stations, and thus give more space for the proposed triangular Place ("Marne Place" shall we call it) between Waterloo Bridge Road, the "Somme Bridge" Road, and the river. *J'offre ces noms serieusement.*

While retaining St. Martin's Church spire as a central point at the northern end the line of the bridge would be swung slightly to the west at the southern end, and the space which would otherwise be reserved for the railway "bottle neck" would go into the roadway and leave more room on the eastern side for useful occupation as well as architectural embellishment. The space proposed for the railway adjacent to the new south side embankment would be reserved for Government and Municipal buildings, which would give scope for all the budding presidents of the R.I.B.A. for years to come. Meantime we must reserve for engineers the design and arrangement of inside utilitarian arrangements of stations and warehouses, while leaving, not unwillingly, the outside ornamentation to architects.

LONDON UNDERGROUND AND L.G.O.C. OPERATING DEPARTMENT EFFICIENCY MEETINGS.

The Camera and the Cinema in the Operation of Transit Companies.

The first operating department efficiency meeting for the season of 1916-17 was held on Monday, October 30, in the L.G.O.C. Training School, Milman's Street, Chelsea, S.W., Mr. H. E. Blain, the operating manager, presiding over an audience of about 200 officials connected with the Underground Railways, the London General Omnibus Company, and the tramway undertakings connected with the London and Suburban group, those present including Messrs. Murray Griffith (director), W. E. Mandelick (secretary), A. R. Cooper (engineer), F. V. McMahon (superintendent of power), W. E. Blake (superintendent of the line), S. J. Webb (passenger agent), of the Underground Railways; Messrs. G. J. Shave (engineer), J. F. Thomas (general superintendent), L.G.O.C.; Messrs. W. E. Hammond (Metropolitan Electric Tramways), A. V. Mason and W. E. Wright (South Metropolitan Tramways), and J. B. Mackinnon (London United Tramways).

An address on "The Camera and the Cinema in the Operation of Transit Companies" was given by Captain A. Rosier, superintendent of training and employment, L.G.O.C., who contrasted the haphazard and inefficient training in operation in the horse vehicle days with the scientific and practical instruction which was now being given to all those dealing with passenger transit. The effect of this training was clearly shown by the remarkable reductions constantly taking place in the number of accidents, notwithstanding the present abnormal difficulties in connection with street lighting, etc.

The use of the camera and the cinema in this instruction was very prominent in the organisation of that school, and a large number of slides and films were exhibited, including the following:—

Sections of the original educational film and slides used in the first lectures to omnibus drivers and conductors, a railway film showing a trip on the District Railway, a series of slides showing some important accidents, slides showing the advertisements and legends used in the L.G.O.C. "safety first" campaign, one of the latest "safety first" films from America, portraying accidents on the street railways of New York, and the new L.G.O.C. "safety" film intended for exhibition at cinema halls.

Miscellaneous views were shown, including:—A war film of the Naval Brigade in Belgium, in which the L.G.O.C. omnibuses were very conspicuous; a review of the L.G.O.C. special constabulary, film showing two of the T.C.T. outings for the dependants of employees at the front, slides of views taken in connection with Omnibus Service No. 107, showing how the camera might be used to bring beauty spots in and around London before the public notice; with a number of photographic slides of the leading officers of the combined companies.

The evening was an exceedingly interesting one, and the thanks of the audience to the lecturer were voiced by Messrs. Murray Griffith, director; W. E. Blake, superintendent of the line; and J. P. Thomas, general superintendent, L.G.O.C. The next efficiency meeting will deal with the subject of social welfare.

Melbourne Suburban Railways Electrification.—As the result of a visit of a representative of the Victorian Railway Commissioners to London the Ministry of Munitions have enabled arrangements to be made to accelerate the delivery of electrical plant. It is hoped the Sandringham-Essendon service will be opened in January.

Queues to be Formed.—It was announced at the last meeting of Huddersfield Corporation, by Councillor E. H. Sellers, chairman of the Tramways Committee, that the department were going to try to adopt the queue system in the hope of doing away with the crowding in boarding cars. A similar resolve has been arrived at by Halifax Tramways management.

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THE CORROSION OF TROLLEY WIRE.

A Microscopical Investigation.

By James Scott.

The serious consequences which are always likely to follow the snapping of corroded copper trolley wire make the investigation of the causes of such defects advisable, and this can best be accomplished with the assistance of the microscope. Although the defect is well known, the procedure is not at all obvious.

The British Electrical Federation, Limited, have very kindly supplied me with a foot length of spoilt single wire of No. o size, i.e., about ⅜ in. in diameter. While a small area of it still retains its natural reddish colour and lustre, the greater part of it is distinctly black. By running the fingers along it, one can detect the difference between the unattacked and the damaged metal, the former feeling smooth and the latter raspy. The reasons for these variations will be explained in the following remarks.

It should be borne in mind that all metals tend to oxidise during exposure or industrial use. Copper appears to be exceptionally immune as a rule to such a process, owing to its resistant nature. It will not oxidise in perfectly dry air (unless other agencies operate on it), and will then retain its characteristic brightness, softness, and ductility indefinitely. But in moist air the liability to oxidation is prevalent, although the rate of occurrence is slow unless it is assisted in some way. Practically the only kind of corrosion to which copper wire is susceptible during use as tramway trolley wire is that of oxidation, owing to the combination of oxygen derived from the atmosphere with the metal. But the electrical current actually hastens the development of this kind of deterioration.

strong sunlight, alternating with rain, is capable of affecting the wire in a similar, if less noticeable, manner. The positive electricity of the live wire induces the formation of oxide. It is believed that normal oxidation is occasioned by the direct action of positively charged atmospherical ions, quite apart from the subject of electrical traction. That being the case, it is easy to understand that the disadvantages would be increased while a current was passing through the wire.

Increase of cuprous ions, resulting in the presence of more cuprous oxide, is due to the actual combination of the positive electricity with the copper particles. During artificial electrolysis, where the current passes through electrodes which have a fluid salt in contact between them, electricity leaves the cathode and deposits the metal on the outside of it. Only the electricity can depart, not the metal which was combined with it in ionic form.

Although it is an electrolytical reaction which occurs in live trolley wire, it is not so easy to understand the routine, but it is probable that damp air acts as an electrolyte, and the current frequently escapes through it, causing the mysterious flashes, and deposits remodelled particles of the metal in their pure state. We will suppose that the current is playing through a partly spoilt portion of the wire. During what may be called normal conditions of dampness and current the increase of black oxide would continue, but excess of vapour allied with changes in the current spur on the reactions, with the result that some of the oxide is changed back into copper, while the electricity itself escapes away from the wire. It seems to me that the lower and upper halves of the partly oxidised wire form temporary anodes and cathodes respectively. These suggestions would explain the existence of actual fine, bright, copper ridges, observable among the blackened surface pieces, along the sides, where the flanges of the trolley wheel rubbed against them.

Fig. 1—Slightly Dulled by the Beginning of Corrosion.

Fig. 2—Oxidation Well Advanced.

Fig. 3—Entirely Coated with a scaly layer of Black Oxide.

Portions of about ½ in. of Copper Trolley Wire.

It must be explained that there are two oxides of copper, namely, the cuprous (Cu_2O.) and the cupric (Cu.O.). The first contains less oxygen than the second, and has to precede it in formation, although this fact is not always very obvious. Cuprous oxide is brownish-red (to the naked eye), whereas cupric oxide is black. The rate of change from one to the other condition is often very rapid. The cuprous oxide may be regarded as temporary and the cupric oxide as permanent. In the case of trolley wire, the conjunction of dampness and the electric current are the main factors in such a course of events. The one helps the other, since neither alone could be mischievous to a great extent.

All electrolytical reactions cause oxidations, or reductions, if the contemporary conditions are favourable, as is the case when moisture is constantly present.

When copper is heated, with free access of air, the oxygen of the air combines with it to produce cuprous oxide. It has to be heated to redness, however, to quickly yield cuprous oxide or black scales. Now the electric current, as readers know, strongly heats the wire. While this may not be powerful enough to correspond with high temperatures from furnace or flame, it could very well cause gradually the same effects as those otherwise due to rapid heating. You may boil a pint of water completely away in a short time, or, contrarily, it may be left exposed to the air for several days and evaporate slowly. The final result is the same in both cases. We ought therefore to expect that continual repetition of electrical heat would be equivalent to shorter durations of higher temperatures.

All the influences—moisture, heat, oxygen, electricity, and metal—help one another in this respect. If the copper, polished brightly, is heated in a smokeless flame it becomes crimson, then violet, blue, and grey. By quenching it in water the greyness is changed to brownish-red. All these states are variations in the cuprous oxidation, to which no definite names can be given. Very

Of course a great deal of the success or otherwise of a trolley wire of the kind under attention depends on the quality of the copper. The very best copper is likely to contain traces of impurities. It is not always the fault of the manufacturer, since the elimination of such substances is not easy. However, speaking in a general sense, the only impurity likely to be found in new, high-grade copper is cuprous oxide, but here we have the actual starting point of the trouble which ends in the blackening and destruction of large quantities of trolley wire.

The cuprous oxide—which, when separate in more noticeable amount, is brownish-red—exists in the copper as very tiny isolated globules of a sky blue tint, the reflection of the light being, no doubt, responsible for this appearance. These increase in number, group together, and darken. It is not necessary that the copper shall be thus affected to corrode badly, but the rate of spoliation is quicker when such cuprous oxide is present. Quite pure copper will suffer from the procedure mentioned in the earlier remarks, but at a slower rate.

Sulphuric acid, derived from the oxidation of sulphurous smoke, etc., is abundant in moist air, but is too weak to seriously attack copper trolley wire. To make copper sulphate—known as bluestone—the metal has to be boiled in sulphuric acid. In continuously moist air copper can absorb carbon dioxide, and thereby get coated with a green film of copper carbonate. But the oxidation, or blackening, is the commonest form of corrosion and the most damaging. This carbonate corrosion is more likely to attack passive copper, which is simply exposed and not worked upon. Microscopical examination helps us to follow the changes brought about in the structure of copper by oxidation. The fresh metal is tough, ductile, and smooth, disclosing faint striations which reflect the light. An area which is dulled by commencing oxidation shows small scattered dark patches, and very tiny, scattered globules,

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both of these being cuprous oxide, as in No. 1. A still denser portion presents an accumulation of the preceding features, as in No. 2, while a wholly black surface reveals compactly disposed angular granules, as in No. 3.

Copper crystallises in the forms of octahedra and rhombic dodecahedra. New metal may be regarded as a substance in which such crystals have welded or fused together homogeneously; yet there must be points of weakness between these undetectable parts. It is evident that the tiny globules of cuprous oxide first appear, coalesce together into larger masses, which meantime change, either partly or wholly, into cupric oxide, between which the remaining cuprous oxide continues to appear. Increase in the dimensions of the particles causes them to join one another, while some get squeezed up beyond the general surface by internal pressure from newly corroding pieces. Complete amalgamation is prevented, and there continues interstices through which oxygen and moisture can pass in and out. Finally, the flaky copper becomes wholly black, hard, and brittle, and liable to fracture very easily.

EDINBURGH TRAMWAY PROPOSALS.

Edinburgh Tramways Committee have now made public the whole of the report prepared by the three consultants upon the tramway system of the city, and the methods of traction which, relative to the whole of the future of the undertaking, might be adopted for the city. The consultants are Mr. J. A. Brodie, city engineer, Liverpool, Mr. J. B. Hamilton, general manager, Leeds Corporation Tramways, and Mr. A. H. Campbell, city engineer, Edinburgh. The report extends to 59 pages. Outlines of the experts' recommendations, 14 in number, have appeared in our columns from time to time.

The report is published in a substantial volume of 60 pages (13 in. × 8¼ in.), in which the important question of the future of Edinburgh tramways is considered with great detail and evident care.

Summarising their report, the experts state :—

(1) That it is not advisable to continue the cable tramway system for the city or for any part of the city after the expiry of the lease in 1919.

(2) That "it is practicable to arrange for a system of traction other than the cable being installed so as to be operated on the expiry of the present lease."

NOTE.—Recommendations (1) and (2) are necessarily subject to war conditions.

(3) That, subject to note preceding, the only alternative system of traction which can be made available at June, 1919, and which we can confidently advise, is the electric overhead system.

(4) That, independent of the existing tramway conditions of the city, the electric overhead system of traction offers the best, most reliable, convenient, and economical solution of the transit requirements of the city and suburbs.

(5) That in the detailed treatment of the overhead equipment, special care should and can be given to the preservation of the amenities of the city.

(6) That we have in our summary of estimates restricted "the central parts of the city" to Princes Street, and for this street we suggest that the tramway should be laid along the south side of the roadway.

(7) That as regards this "central part of the city," whilst temporarily it must be equipped with the overhead system (unless diverted), the conduit system may be constructed subsequently—should the Corporation so desire.

(8) That it is desirable that facilities for through-running between the tramways of the city and the neighbouring tramway undertakings should be provided.

(9) That, "keeping in view the proper development of the undertaking in relation to future extensions," we think that the tramway system should be extended by a total route length of 8¾ miles.

(10) That we think that the influence of the motor omnibus traffic upon the future of street transit in the city should be considered by the committee with a view to co-ordination and the avoidance of waste.

(11) That the electric current should preferably be obtained from the Corporation's new power station at Portobello.

(12) That it will be necessary at an early date to initiate arrangements with respect to the provision of suitable rolling stock and additional depot accommodation.

(13) That if the Corporation decide to continue the cable system after the expiry of lease, it will be necessary :—

(a) To initiate arrangements for the provision of new rolling stock (suitable for conversion and adaptation to other form of traction at a later date).

(b) To provide additional depot accommodation.

(c) To restrict the programme of extensions to routes capable of being worked by "self-propelled" cars, and running along and over the existing cable lines, and

(d) To arrange for the cables which will be doing duty at the close of the lease being available thereafter.

(14) That it is desirable in the event either (1) of electric being installed or (2) of the cable being continued, that an electric battery tramcar and a "self-propelled" tramcar should be acquired with a view to running in series with other cars, provided arrangements can be made for their trial.

ESTIMATES OF COSTS AND ANNUAL BALANCES.

Estimates of costs of installation and of working, with the resultant surplus or deficit upon each system, are shown upon several tables, and the following summary is given, the year of working assumed being 1919–20 :—

	Revenue per Annum.	Operating Costs per Annum.	Capital Expenditure. New Debt.	Interest and Redemption Charges in respect of New Debt.	Annual Balance available. +Surplus. −Minus.
	£	£	£	£	£
1. Cable (confined to present lines) ...	322,908	228,034	256,312	26,655	+68,219
2. Cable (confined to present lines) but two extensions operated by "self-propelled" cars	334,908	238,130	342,510	35,088	+61,690
3. Electric overhead as in No. 2 ...	340,908	207,112	836,750	66,747	+67,049
3a. As No. 3 but with conduit in Princes Street ...	340,908	211,112	924,250	72,747	+57,000
4. Electric overhead throughout (with 8¾ miles extensions)	356,908	217,007	936,500	73,663	+66,236
4a. As No. 4 but with conduit in Princes Street ...	356,908	221,007	995,000	65,665	+58,000
5. Electric conduit, restricted to existing cable routes (with Queen Street added)	328,908	211,639	1,335,750	99,305	+17,964
6. Motor omnibuses (over extended routes as No. 4)	350,000	283,334	602,000	82,318	−15,562

The capital expenditure under No. 1 is chiefly for rolling stock.

The result under No. 2 is affected by local conditions, and does not correctly reflect operation by "self-propelled" cars.

Under Schemes 3 to 5 the capital cost of the conversion, reconstruction, and extensions of electric systems are included, and charged against the gross surplus before striking the net balance available.

Under No. 6 the direct deficit plus indirect charges amounts in all to about £39,425 per annum.

The general effect of the report is to recommend overhead traction on all routes, the conduit being substituted in Princes Street if an experiment with the overhead on the south side of the street does not prove satisfactory. As regards Princes Street, the Corporation might be helped to a wise decision at a later stage by the adoption of Queen Street (north side) as an alternative route, so enabling Stockbridge, Comely Bank, and Canonmills districts to be brought into immediate communication with the Caledonian and Waverley Stations without change of car. The cessation of cable traction on the termination of the lease need not, the report states, be viewed with anxiety. Against the unredeemed capital there would be assets in the rails, concrete foundation, paving setts, four power stations and their sites, the power plant (engines and boilers), and the Ardmillan to Slateford electric line. The debt which would remain upon the whole undertaking has therefore valuable tangible assets to be deducted from the £400,000 unredeemed at the close of the lease; the actual net charge to be carried forward to the new system of traction would therefore be approximately £200,000. Compared with the debt assumed by other tramway undertakings as the price of municipalisation, this sum, the report observes, is small and need create no uneasy feeling concerning the capabilities of the new system to bear it.

Bombay Tramways Extension.—A committee of the Bombay Corporation have recommended that sanction be given to an application by the Tramways Company to extend their lines along Kingsway. This new thoroughfare has not yet been taken over by the Council, but the Corporation solicitor has advised that the authority have the power to grant the application. Attached to the committee's recommendation is a proviso that if the Corporation at some period subsequent to the laying of the lines decide to lower the levels of the road the company shall bear the expense of any alteration in the levels of their lines.

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LONDON COUNTY COUNCIL TRAMWAYS.

The London County Council have from time to time formulated certain rules for the guidance of the Tramways Department, and the rules now form a part of the "Standing Orders" of the Council. They deal only with a few particulars, however, on which there have been discussions at various times, and in regard to which the Council have been able to arrive at definite instructions. These regulations, which we give below, received, of course, the previous approval of the Highways Committee, to which the general direction of the tramway undertaking is entrusted. This committee consists of a chairman (Mr. G. H. Hume) and 15 other members, who carry on the routine work by means of various sub-committees. The permanent head of the department is described as the "Chief Officer of Tramways." This position was filled by Mr. Alfred Baker from January, 1899, to December, 1903, when he resigned in order to accept the general management of the Birmingham Corporation Tramways. Mr. A. L. C. Fell, then general manager and engineer of Sheffield Corporation Tramways, was appointed as successor to Mr. Baker, and he has been responsible for the management of the Council's undertaking during the past twelve years—a period which has witnessed the practical completion of the conversion to electric traction and the great extension and growth of the system. The tramways have become so essential to the life of the Metropolis that they are now taken as a matter of course, like those wonderful undertakings the Metropolitan Waterworks and the sewerage system, which are so vitally important, but about which so little is said. The magnitude of the responsibility which rests upon the Highways Committee and their Chief Officer may be to some extent appreciated when it is remembered that the total capital now invested in the Council's tramways aggregates £13,028,000. This sum has provided 277 miles of electric and 14 miles of horse tramway track, more than 2,000 cars, the great generating station at Greenwich, and the necessary sub-stations, besides the car depots and repair shops, which are required for the maintenance of the plant and rolling stock.

REGULATIONS RELATING TO THE TRAMWAY DEPARTMENT.

Chief Officer of Tramways.

The Chief Officer of Tramways shall have control of the staff exclusively employed in connection with the working, maintenance, repair, and renewal of the tramways, and with the maintenance, repair, and construction of the cars and other vehicles used on or in connection with the tramways; and except as regards officers appointed under any scheme of classification approved by the Council he shall have power to appoint and to dismiss any person under him, and he shall be responsible for the conduct of the entire staff, and generally for the efficient working of the tramways undertaking under his charge.

Overtime and Temporary Assistance.

The Chief Officer of Tramways shall be authorised to employ men on overtime when required and to pay them therefor; and to engage from time to time such temporary assistance as he may require in connection with the working of the tramways.

Medical Examination of Motormen.

Motormen about to be employed in the Council's tramway service shall undergo a medical examination (including an eyesight test).

Drivers of horse cars whom it is proposed to transfer to electric cars shall be submitted to a modified medical examination, which shall be of such a character as to guarantee the public against danger from the collapse of men predisposed to fits, fainting, and sudden death, having regard to the nature of the men's employment.

Provision of other Employment for Men Disqualified on Medical Grounds.

Drivers of horse cars about to be promoted to drive electric cars, who are medically examined and found to be medically unfit to act as motormen, shall not be dismissed on account of the result of this examination, but shall be offered other employment in the tramways department at rates of pay not less than those of the lowest grade of their present employment, provided that the men are physically fit for the duties that they are thus called upon to perform, and so long as they efficiently perform such duties, it being understood that full power is reserved to dismiss any man for misconduct.

Medical Examination of Switchboard Attendants and Charge Shift Engineers.

Before any man is employed as a switchboard attendant or charge shift engineer at the Greenwich generating station or at a sub-station he shall be medically examined, and arrangements shall be made for all such persons to be re-examined periodically.

Applicants for employment in the tramways department who have made claims under the Workmen's Compensation Act, and men transferred or appointed to positions to which sick pay allowances are attached, shall be medically examined.

Clothing for Tramway Employees.

Uniform or other suitable clothing shall be supplied in accordance with such rules as may be prescribed to the operative staff of the tramways department.

Permanent Way Employees—Payment during Inclement Weather.

Permanent way employees in the tramways department engaged on road repairing work who arrive at their work at the regular time in the morning, and are prevented from starting work owing to inclement weather, shall be paid for one hour's work at their respective rates of pay in respect of each such morning, provided that this regulation shall not apply to cases in which men put in an appearance contrary to standing instructions.

Motormen and Conductors.

Motormen and conductors in the tramways department shall receive half pay while learning, motormen for a period not exceeding three weeks, and conductors for a period not exceeding one week.

Special Service Pay and Badges.

The motormen engaged before November 15, 1910, on routes of the Council's electric tramways which were before that date regarded as special on account of steep gradients, etc., shall be awarded extra pay as follows:—

(i.) For one year from the date of transfer to a special route, a bonus of 2d. a day.

(ii.) After one year's satisfactory service on a special route, a second bonus of 2d. a day.

(iii.) After two years' satisfactory service on a special route, a third bonus of 2d. a day.

Precautions against Fire.

An inspector shall be employed in the tramways department at a rate of pay of £3 10s. a week to drill periodically a certain number of the men at each tramways depot both on day and night duty, and to examine the fire appliances, etc., at such depots. The men shall be drilled during working hours, and shall be paid, in addition to their ordinary wages, a sum of 7s. 6d. a quarter each.

Sick and Accident Pay.

Payment in accordance with such rules as may be prescribed shall be made (i.) during absence through illness not due to intemperance or misconduct to such of the operative staff in the tramways department as are in receipt of standard weekly wages and (other than temporary office assistants and women checkers) are not paid for overtime, and (ii.) during absence owing to injury received in the execution of duty to any member of the operative staff.

London County Council Tramways Employees' Sick Fund.

An annual contribution not exceeding £50 shall be made towards the London County Council Tramways Employees' Sick Fund.

Assistants in Ticket Checking Section.

(*a*) The total weekly office hours (including time allowed under clause (*b*) of this regulation for assistants in the ticket checking section of the tramways department shall be 46, viz., from 9 a.m. to 5 p.m. each weekday except Friday and Saturday; from 9 a.m. to 7 p.m. on Friday; and from 9 a.m. to 1 p.m. on Saturday.

(*b*) Every assistant in the ticket checking section of the tramways department shall be allowed to be absent one hour for refreshment in the middle of each day except Saturday.

(*c*) Every assistant in the ticket checking section of the tramways department shall be paid on the basis of her respective rate of pay for such time as she is required to work beyond her usual office hours, provided that overtime of less than half an hour on any one day shall not be taken into account in computing the number of hours to be paid for each month, and provided also that such overtime shall only be worked under the special authority of the Chief Officer of Tramways.

Allowances to Inquiry Officers and Pay Clerks.

An allowance of 1s. a day each shall be made to tramways pay-clerks when engaged in the payment of wages, but the allowance to any one clerk shall not exceed 3s. in one week.

An allowance of 5s. a week shall be made to one of the inquiry officers in the tramways department whilst employed in making private and confidential inquiries in respect of claims arising out of tramway accidents.

Night Work for Engineers at Tramway Depots.

Engineers employed at the tramways depots shall be paid in respect of night work in accordance with the conditions of labour agreed between associations of employers and trade unions (time and a half for night shifts). Night work shall, as far as possible, be dispensed with.

Absence owing to Infectious Disease.

When a man employed in the tramways department is required to remain at home owing to the presence of infectious disease in his house, the Chief Officer of Tramways shall be authorised to allow such man half pay, subject to the production of a medical certificate to the effect that such absence is necessary. The Chief Officer may, in such cases, allow an addition to the half pay provided that the rate of full pay is not exceeded.

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Temporary Clerical Assistants.

(*a*) Candidates for appointment as temporary clerical assistants (youths) in the tramways department must be over 15 and under 17 years of age on the latest date for receiving applications to sit for the examination for such appointments.

(*b*) The rates of pay of temporary clerical assistants in the tramways department shall be :—

Youths, commencing at 15s. a week and rising by 2s. a week annually to 29s. a week.

Men, section (*b*), commencing at 30s. a week and rising by 2s. 6d. a week annually to 40s. a week.

Men, section (*a*), commencing at 40s. a week and rising by 2s. 6d. a week annually to 60s. a week.

Office Hours.

(*a*) The office hours at the head offices of the tramways department so far as the requirements of the service permit, shall be from 9 a.m. to 5 p.m. each weekday, except Friday and Saturday ; on Friday the hours shall be from 9 a.m. to 5.30 p.m., and on Saturday from 9 a.m. to 12.30 p.m.

(*b*) Every officer shall be allowed to be absent one hour for refreshment in the middle of each day except Saturday.

(*c*) The classified and temporary staff in the tramways department shall record their time of arrival at, and departure from, the head offices on an attendance signature clock ; typists shall record their time of arrival and departure in an attendance book. A record shall be kept of the occasions on which officers arrive later than ten minutes after the time fixed for commencement of work.

Overtime for Office Staff.

Members of the temporary clerical, technical, and drawing office staff at the Finsbury Pavement, Belvedere Road, and Camberwell tramways offices who are in receipt of a rate of pay not exceeding £3 a week, and officers in the fourth class in the tramways department, if recommended by the Chief Officer of Tramways, shall be paid on the basis of their respective rates of pay for such time as they are required to work beyond their usual office hours, provided that overtime of less than half an hour on any one day shall not be taken into account in computing the number of hours to be paid for each month. Payments hereunder shall be made in each case on the recommendation of the Chief Officer of Tramways, subject to details being reported to the appropriate committee in due course by the chief officer, and to the Clerk of the Council reporting periodically on such overtime. Assistants entitled to overtime payment under this regulation shall not be allowed to receive refreshment allowances.

Central Administrative Staff.

(*a*) The expression "central administrative staff," when used in relation to the tramways department, shall include such of the staff of that department as are appointed by name by the Council, except such officers as are engaged on work peculiar to the tramways department.

(*b*) The expression " operative staff of the tramways department " shall include all staff in that department in relation to which the Council has by its resolution of March 29, 1899,* entrusted special powers to the Chief Officer of Tramways.

Service of Tramways Employees on Juries.

Men employed in the tramways department shall be paid their ordinary wages when serving on juries, but any fees which they may receive shall be paid into the tramways account.

Apprenticeship Scheme.

(*a*) Apprentices may be engaged in the tramways department between the ages of 15 and 17 years for a period of not more than five years nor less than four years of not more than 2,700 working hours each year.

(*b*) The wages of apprentices shall be :—

Until he attains 16 years of age, 6s. a week ; 17 years, 8s.; 18 years, 10s.; 19 years, 12s.; 20 years, 14s.; 21 years, 16s.

Provided that (i.) Apprentices in the permanent way section shall be granted, in addition to their ordinary wages, an outdoor allowance of 2s. a week during the first three years of the apprenticeship course, and 3s. a week during the remainder of the term. (ii.) Boys employed in the permanent way section who are to be indentured as apprentices on attaining the age of 16 years shall be paid at the rate of 6s. a week, with an outdoor allowance of 2s. a week during their pre-apprenticeship stage.

(*c*) Apprentices over 18 years of age when working overtime shall be paid the usual overtime rates obtaining in the district ; the time so worked shall be reckoned as working hours.

(*d*) No apprentice less than 18 years of age shall work after 2 p.m. on Saturday or 6 p.m. on any other working day.

(*e*) Apprentices shall be allowed not more than six hours' time off in any one week for the purpose of attending approved classes of technical instruction ; and time spent at classes shall be reckoned as working hours.

(*f*) Pay in respect of absence owing to illness or other incapacity to work may be granted to apprentices at the discretion of the Chief Officer of Tramways, and any other conditions under which they may work shall be in accordance with such rules as may be prescribed.

* See regulation above relating to chief officer of tramways.

Boys and Youths.

The rates of pay of boys and youths (other than apprentices) employed at the central car repair depot shall be as follows :—

Until attaining the age of	16	years	...	2½d.	an hour.
,, ,, ,,	17	,,	...	3d.	,,
,, ,, ,,	18	,,	...	3½d.	,,
,, ,, ,,	19	,,	...	4d.	,,
,, ,, ,,	20	,,	...	4½d.	,,
,, ,, ,,	21	,,	...	5d.	,,

After attaining the age of 21 years not less than 6d. an hour.

Boys in the printing section shall be paid from 8s. to 18s. a week, rising by annual increments subject to satisfactory service.

Messenger and telephone boys shall be paid from 10s. to 18s. a week, rising by annual increments subject to satisfactory service.

Until he attains the age of 18 years each boy or youth (other than an apprentice) employed at the central car repair depot shall attend, during working hours, classes for technical instruction ; these classes shall be conducted at the central car repair depot ; no deduction in pay shall be made for the attendance, and each class shall meet for two periods each of two hours a week.

Medical Advice on Tramway Claims.

Three medical men shall be retained to act as medical advisers in connection with tramway claims upon the undermentioned terms—a retaining fee of £21 a year each, 10s. 6d. for each examination, and £2 2s. for each attendance at court to give evidence, with special fees to be determined by the solicitor for examination outside the County of London, having regard to the distance. These arrangements shall be terminable at any time on short notice.

Vehicles, etc., Damaged in Tramway Accidents.

The Chief Officer of Tramways shall be authorised to make such payments as he may deem necessary in respect of obtaining expert assistance with regard to the examination of vehicles, etc., damaged in consequence of tramway accidents.

Fares for Parties of Children and the Blind.

Such special fares as may be prescribed shall be charged on the Council's tramways to parties of children under the charge of a responsible person, provided that the journeys each way are so timed as not to interfere with the ordinary tramway traffic.

Necessitous blind persons properly authenticated shall be carried free on the Council's tramcars provided that they are accompanied by a guide.

Carriage of Parcels.

Parcels shall be allowed to be carried by passengers on the Council's tramways in accordance with such rules as may be prescribed.

Wood Paving in Tramway Tracks.

In connection with the construction and reconstruction of tramways for electric traction, wood or some other form of noiseless paving material shall be used for the tramway area (i.) in front of hospitals, and (ii.) opposite places of worship which abut on or are situated adjacent to the roads in which the tramways are laid.

Paving of Tramway Tracks opposite Schools, etc.

Use of Silent Material.—In cases in which the Council is laying electric tramways on new or existing routes or in which it is decided to renew the paving of existing tramways, the portions of the tracks opposite elementary and secondary schools, polytechnics, and other educational institutions wholly or partly maintained by the Council and abutting on the roads in which such tramways are laid, shall be paved with wood or other silent material, provided that the remainder of the carriageway opposite any such school or institution is also paved with wood or other silent material.

Distance between Centres of Tracks.

Except at curves and at other places where special circumstances apply, the Council's electric tramways shall be laid with a distance of 8 ft. 6 in. from centre to centre of the tracks.

Allocation of Cost of Improvements.

When the widening of a thoroughfare is entirely necessitated by the construction of a new tramway, or the doubling of an existing single line of tramway, the whole cost of the improvement shall be charged to the tramways account.

When the widening of a thoroughfare is partly necessitated by the construction of a new tramway or the doubling of an existing single line of tramway, the cost of such widening, or such balance as is not contributed by a metropolitan borough council, shall be allocated to the tramways account and the account of the improvement respectively, in such proportion as shall be fixed, regard being had to the benefit accruing to the tramway traffic and to the general traffic respectively, provided that the consideration whether a tramway is likely to result in financial loss or gain shall not be a determining factor in deciding whether any or what proportion of the cost of a street widening consequent on the construction of the tramway shall be debited to the account of the improvement.

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In cases of street widenings along the routes of existing tramways electrically worked, where double lines already exist, and there is a margin of at least 9 ft. 6 in. between the outer rail and the kerb, and where there is a sufficient radius, no amount shall be charged to the tramways account.

When powers are obtained for new tramways along thoroughfares which have been widened for the purposes of general traffic, and the width is sufficient for a double line of tramway, no amount shall be charged to the tramways account, provided that the improvement has been completed for more than five years.

When improvements have been undertaken in connection with tramway schemes, but powers for the construction of the tramways have not been obtained, no amount shall be charged to the tramways account until such time as powers to make a tramway have been obtained.

RECEIPT OF FEES.

Any fees received by an officer or employee of the Council, either as a witness or in any other capacity, shall, unless otherwise ordered by a committee, be paid into the county fund.

WEEKLY REST DAY.

Every employee of the Council shall, unless otherwise ordered by resolution of the Council, have the equivalent of one complete day's rest from his employment in seven days, provided that (i.) in cases of emergency chief officers of the Council may require all or any employees to work on the day secured to them for rest, but the making of such a requirement and the facts upon which it is justified shall be forthwith reported to the Council; and (ii.) this regulation shall not apply to the members of the London Fire Brigade, nor to any person employed for part time on night inspection duty at the central offices.

OFFICERS PERMANENTLY ENGAGED.

(*a*) Officers permanently engaged on clerical, professional, or technical work shall be classified as follows:—

Fourth Class.—Section (*b*), commencing at £75 a year and rising by £5 annually to £100 a year. Section (*a*), commencing at £100 a year and rising by £10 annually to £150 a year.

Third Class.—Commencing at £160 a year and rising by £10 annually to £200 a year.

Second Class.—Commencing at £200 a year, and rising by £12 10s. annually to £250 a year.

First Class.—Commencing at £255 a year, and rising by £15 annually to £300 a year.

(*b*) Appointments to the fourth class in the tramways department shall be made on the combined results of examination and selection; the examination shall include a compulsory paper on tramways work; and this examination may be taken by assistants who have entered the service *under Regulation No.* 695, that is, as temporary clerical assistants, after not less than three years' and not more than seven years' service in the department in the capacity of temporary clerk.

(*c*) Each officer appointed under this regulation shall be on probation for a period of twelve months from the date of appointment, and at the end of that period the head of the department in which he is serving shall report not only as to the conduct of the officer, but also whether his abilities justify his retention on the permanent staff.

(*d*) Promotion to the third, second, or first class shall take place only upon the occurrence of a vacancy in those classes or on the addition to the staff of officers in those classes.

SUBSISTENCE.

Subsistence allowances shall be made to officers and employees in accordance with such rules as may be prescribed.

TRAVELLING EXPENSES.

Expenses necessarily incurred by persons employed by the Council in travelling in the course of their duties shall be paid by the Council, provided that this regulation shall not authorise the payment of any travelling expenses incurred by any such person in reaching or returning home from the district, office, or institution in or at which he or she is ordinarily employed.

LEAVE TO AUXILIARY FORCES.

Subject to the exigencies of the service permitting in each individual case the adoption of such a course, facilities as to extra leave shall be afforded in accordance with such rules as may be prescribed to such officers and employees, including persons engaged at hourly rates of pay or paid for piecework who have been continuously employed for three months, but excluding members of the London Fire Brigade, as are members of the Royal Fleet Reserve or the Territorial Force to enable them to attend annual training, on the understanding that such extra leave is not in any sense to be regarded as a right, and may be withheld at any time.

RETIRING ALLOWANCES.

(*a*) No special allowance in addition to any allowance payable under the Superannuation and Provident Fund Scheme shall be made in respect of officers or employees merely on the ground of their having entered the service at the age of 30 or upwards.

(*b*) The question of granting to any officer or employee who has rendered distinguished or exceptional service, or who breaks down at an early age, a special allowance additional to any allowance payable under the Superannuation and Provident Fund scheme shall be dealt with on the merits of the case.

(*c*) Any special allowance granted to any officer who may have had a considerable temporary or unestablished service before becoming a contributor to the Superannuation and Provident Fund, and who has not been given the option of paying up back contributions to the fund in respect of his service in a temporary capacity, shall be the equivalent of what the Council would have contributed during temporary service if the officer had been a contributor.

PENSIONS AND SUPERANNUATION.—ASSIGNMENT OF PENSIONS.

(*a*) No voluntary assignment of pensions granted by the Council to officers transferred to the service under the provisions of the London Parks and Works Act, 1887, shall be recognised by the Council.

(*b*) Any pension or allowance granted in accordance with the provisions of Section 60 of the London County Council (General Powers) Act, 1891, Section 44 of the London County Council (General Powers) Act, 1895, Section 55 of the London County Council (General Powers) Act, 1907, or Section 63 of the London County Council (General Powers) Act, 1909, shall be granted on condition that the Council may, if it thinks fit, determine such pension or allowance if the person to whom it shall have been granted shall assign the same without consent on behalf of the Council or if such pension or allowance become chargeable with the debts of such person.

EMPLOYMENT OF SUPERANNUATED EMPLOYEES.

No person in receipt of a retiring or superannuation allowance or pension granted by the Council shall be employed in the Council's service to perform duties which are the same as or analogous to those performed by him in his original office. In no case shall the salary or wages paid to any person, together with any such retiring or superannuation allowance or pension, exceed the rate of salary or wages of which he was in receipt at the time of his retirement.

NATIONAL INSURANCE ACT.—DEDUCTIONS FROM SICK PAY.

Where necessary, deductions shall be made from the sick pay allowed to employees insured or exempted under Part I. of the National Insurance Act, 1911, so as to ensure that the total rate of sick pay from the Council and of sickness or disablement benefit under the National Insurance Act shall not exceed the full rate of pay. For the purpose of computing these deductions every employee insured or exempted to whom sick pay is granted by the Council shall be deemed to receive sickness benefit under the Act at the rate of 10s. a week in the case of a man and 7s. 6d. a week in the case of a woman during the first 26 weeks after the first three days of sickness, and thereafter, disablement benefit at the rate of 5s. a week if the disablement continues; provided that (i.) if an insured employee produce to the satisfaction of the comptroller proof that he or she was not in receipt of or entitled to sickness or disablement benefit, or was in receipt of reduced benefit, he or she shall be refunded any deduction or excess deduction which may have been made on the basis of the receipt of full benefit; and (ii.) in case of doubt or where it appears that the refund should not be made the comptroller shall submit the application to the appropriate committee for their decision.

Every officer or employee of the Council who, under the certificate granted under Part II. (*b*) of the first schedule of the National Insurance Act, 1911, by the joint committee of the several bodies of commissioners appointed for the purpose of Part I. of the Act acting jointly with the Insurance Commissioners established under the Act, is excepted from the operation of Part I. of the National Insurance Act, 1911, shall receive not less than the remuneration and be entitled to not less than the allowances specified in the schedule which is attached to such certificate, and which is applicable to conditions under which he serves as regards superannuation or pension.

Melbourne Council Ask for Conduit Traction.—A resolution has been passed by the City Council of Melbourne asking the Government if it is decided to electrify the cable tramways to provide for placing the electrical equipment underground. A recommendation to that effect was made to the Corporation by their Public Works Committee, and the Lord Mayor stated that any scheme for the overhead system would be strongly opposed. In the bill about to be introduced by the Government for the control of the tramways in and near Melbourne, provision is made for compensating the Railway Commissioners for the loss of revenue anticipated on the suburban railways after the electrification of and linking up of the tramways.

Metropolitan Association of Tramways Managers.—A meeting of the members of this association was held at the Municipal and County Club, Whitehall Court, Whitehall, S.W., on October 20, when there were present Messrs. W. C. Ullmann (East Ham), F. Schofield (Leyton), L. E. Harvey (Ilford), J. C. Williams (Erith), W. E. Hammond (Metropolitan), J. Mackinnon (London United), A. V. Mason (South Metropolitan), L. Slattery (West Ham), and T. B. Goodyer (Croydon). Mr. Ullmann was re-elected chairman, Mr. Hammond was elected vice-chairman, and Mr. T. B. Goodyer was re-elected hon. secretary. Letters of inability to attend were received from Mr. J. K. Bruce (London County Council), Mr. W. Murray (Walthamstow), and Mr. H. P. Stokes (Bexley). Various matters of interest were discussed.

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LONDON GENERAL OMNIBUS COMPANY SAFETY CAMPAIGN.

An admirable idea has been adopted by the London General Omnibus Company with a view to stimulating the interest of their employees in the "Safety First" campaign. It is an order of merit chart showing the positions of each of the 25 garages in regard to the number of accidents per 10,000 miles run in 1916 as compared with 1915. The chart is exhibited in the garages, and Mr. H. E. Blain, the operating manager, has had it reduced in size for reproduction in the company's weekly traffic circular, so that the employees can study it at their leisure. The innovation should certainly exert a beneficial influence by inducing the drivers and conductors to strive to place their garage in the premier position. This is now held by Mortlake, with a record of 1·483 accidents per 10,000 miles, as compared with 1·797 in 1915. For the whole of the garages there is this year a decrease of 24·8 per cent. in accidents per 10,000 miles as against 1915. The chart is in the form of a staircase, and there is a well-worded expression of approval of the Mortlake figures and an exhortation to other garages to "step up to safety." In one corner is the inscription, "When in doubt take the safe course."

IMPROVED DESTINATION LAMPS.

Messrs. Gabriel and Company, of Birmingham, have recently put upon the market an improved arrangement for indicating the destination of tramcars and other vehicles. Owing to the restricted lighting regulations it is very important to secure a distinct and at the same time a subdued light at night. Messrs. Gabriel have successfully overcome the difficulty involved, and, as can be seen from the illustrations, make use of the dash lamp at present in use, which clearly indicates the destination of the car both by day and by night. The arrangement is very simple in construction, and can be added to any existing lamp at a moderate cost without having to make new fronts for the lamps.

The illustrations show two designs. In Fig. 1, "Cannon Hill, 37," the clear glass is placed as usual in the front of the lamp, and at the back of this is placed a lettered plate or stencil with the number of the route and destination of the car. The retaining ring is hinged inside the lamp, and into this is fitted by means of clips an opal glass circle at the back of the stencil. The stencil is painted a dull black, and when the lamp is viewed from the front a perfectly distinct clear sign is shown by day, and when the lamp is lighted at night an equally clear sign is shown.

Destination Lamps for Tramway Cars.

The second design shows a similar arrangement indicating "Alcester Lanes End," but in this case the stencil "Birmingham" (Fig. 3) is fitted into a rim or circular groove at the front of the lamp, as shown in Fig. 2. A clear glass is fitted to the front of the lamp as usual, and an opal circle is placed at the back, the whole being held together by the retaining ring. In some cases this arrangement is preferable when the route has to be constantly varied.

The stencils are fitted with eyes or loops by which they can be conveniently carried on the inside of the dash of the car. Either arrangement is perfectly water and dust proof, and when used the destination box can be dispensed with.

Messrs. Gabriel and Company have recently fitted a number of the Birmingham Corporation cars with this arrangement, which should appeal to many tramway managers.

WOMEN DRIVERS AND CONDUCTORS.

The appended list gives the number of women employed as drivers and conductors upon the various municipal tramways in the United Kingdom up to the end of September. Some additions have been made to the numbers employed in a number of towns, and including company-owned tramways there are probably not less than 10,000 women now engaged in tramway service.

WOMEN EMPLOYED ON MUNICIPAL TRAMWAYS.

Corporation.	Conductors.	Drivers.
Aberdare U.D.C.	7	—
Aberdeen	107	—
Accrington	17	—
Ashton-under-Lyne	8	—
Ayr	12	16
Barking Town U.D.C.	—	—
Belfast	—	—
Bexley U.D.C.	21	—
Birkenhead	60	—
Birmingham	860	—
Blackburn	30	3
Blackpool	48	—
Bolton	44	—
Bournemouth	—	—
Bradford	215	—
Brighton	82	—
Burnley	38	—
Burton-on-Trent	11	—
Bury	54	—
Cardiff	120	8
Chester	1	—
Chesterfield	27	—
Colchester	16	—
Colne	—	—
Coventry	67	—
Croydon	98	—
Darlington	22	—
Darwen	11	—
Derby	53	—
Doncaster	40	6
Dover	12	—
Dundee	—	—
East Ham	—	—
Erith U.D.C.	15	—
Glasgow	1,054	150
Gloucester	26	—
Great Yarmouth	9	—
Halifax	80	—
Haslingden	—	—
Heywood	—	—
Huddersfield	55	—
Hull	113	—
Ilford	20	—
Ilkeston	11	—
Ipswich	49	—
Keighley	17	—
Kilmarnock	12	—
Kirkcaldy	13	—
Lancaster	—	—
Leeds City	397	—
Leicester	182	—
Leith	36	—
Leyton U.D.C.	42	—
Lincoln	—	—
Liverpool	450	—
London County Council	1,687	—
Lowestoft	16	—
Maidstone	13	—
Manchester	515	—
Nelson	7	—
Newcastle	255	—
Newport	12	—
Northampton	25	—
Nottingham	145	—
Oldham	76	—
Pontypridd	3	—
Portsmouth	150	—
Preston	58	—
Rawtenstall	17	—
Reading	47	—
Rochdale	32	—
Rotherham	65	—
Salford	266	—
Sheffield	575	—
Southampton	80	—
Southend-on-Sea	40	—
Southport	24	—
South Shields	26	—
Stalybridge, Hyde, Mossley, and Dukinfield	32	—
Stockport	45	—
Sunderland	70	—
Swindon	—	—
Wallasey	64	—
Walsall	30	—
Walthamstow	90	—
Warrington	21	—
West Ham	54	—
West Hartlepool	24	—
Wigan	59	—
Wolverhampton	42	—
York	41	6
	8,768	189

OMNIBUS TRAFFIC IN WORCESTERSHIRE.

In the annual report of Mr. C. F. Gettings, the county surveyor of Worcestershire, on main road and bridge maintenance during the year ended March 31 last, the following paragraph appears:—

"The motor omnibus traffic has continued to increase, some new services being opened and a number of the services already scheduled in previous reports being extended." There are now services over 216 miles of main roads in the county, which is exclusive of roads maintained by borough or urban district councils. As I pointed out in my last annual report, the whole of these services have been put into operation since September, 1912. The Local Government (Emergency Provisions) Act, 1916, which includes special clauses relating to the establishment of motor omnibus routes, is now under your consideration. It appears that this Act was brought about more to prevent the immediate extension of motor omnibus services than to establish a principle of contribution towards the upkeep of the roads. Unfortunately this county has been hit very severely in this direction, and, although it is admitted that the services are a convenience to the public, it is a debatable question as to whether the benefits enjoyed are recouped by the county in an indirect manner. There is no doubt that this traffic is one of the most destructive that has ever been put on to the public highway."

Last year a sum of £85,834 was allotted for maintenance, the surveyor's estimate having been reduced by £14,901 in consequence of the shortage of labour and the difficulty of obtaining material. These causes also led to an unexpended balance of £9,572 being carried over to the present year. Mr. Gettings adds that it is quite evident that this reduction of expenditure cannot be continued without serious results, especially as the heavy motor traffic continues to increase, and it is already quite perceptible on many of the roads which have been starved.

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RUSSIAN TRAMWAYS LAID ON ICE.

OPENING OF LINE AT ARCHANGEL.

In connection with the electric tramways undertaking recently opened by the Archangel Council, Mr. Stephen Graham has incidentally recorded, in a report of the inaugural ceremony contributed to the *Times*, that "soon the harbour will freeze and the rails will be laid on the ice all the way to the Economy Piers, and there for a time the ships will unload." The expedient of laying an electric trolley tramway on the ice is not, we may observe, a new one in Russia. Such a tramway is in operation for five months of the year over the River Neva at Petrograd, the line being one and a half route miles. A description and illustration of the tramway appeared in THE TRAMWAY AND RAILWAY WORLD of April 17, 1902, and the information was embodied in a paper on "Tramways of the World," read by the late Sir J. Clifton Robinson, managing director of the London United Tramways Company, at the Congress of the Tramways and Light Railways Association in 1908.

Mr. Graham's report of the Archangel ceremony is appended, and from it readers will observe that our Ally imparts a religious aspect to the inauguration of tramways, which is in striking contrast to the Turkish habit of slaughtering a ram on the rails. "I was invited by the town council," writes Mr. Graham, "to partake of a glass of tea on the occasion of the opening of the electric tramway. All the notables of the town were accommodated on board a special steamer, and went slowly along from the Cathedral Pier a mile or so to the new electric power station. Here priests met us with banners and ikons and holy water. A service was held in the power station, and the smell of burning incense mingled strangely with the smell of new paint and oil and machinery. Holy water was flung in all corners and over our heads, and then the dynamos were set in motion and the whole place buzzed and groaned. I think Repin, the engineer, proud of having constructed the most northern tramway in the world, was a little anxious lest the holy water should spoil his engines. But all went well, and we took our seats in the cars to make the first journey, all the notables of the town, and with them every beggar and labourer and tatterdemalion dockhand that could get a footing. In Germany I can imagine how swiftly these gentlemen would have been dealt with. But in Russia 'all is permitted.' We went cheerfully along on our parade journey. The women conductors in new uniforms and clips and punches stood with their money bags and their rolls of tickets. Directly following our trip to the town hall the cars were open to the public, and fares would be collected. Car after car drew up there, and we came out and walked up the stone stairs to the long tables and the glasses of tea and the proud speeches of the great men of Archangel. Now the cars are in full operation, and bring in about £1,000 a week. Archangel is united, and friends within the city have become nearer. All day the cars carry passengers, and all night they carry goods, so I am told." The war has brought a vast increase of trade to the port of Archangel, most of the ships being British.

NEWCASTLE TRAMWAYS WAR SERVICE.

In his annual report Mr. E. Hatton, the general manager of the tramways, says that the number of passengers for the year ended March 31 last was 73,000,000, being an increase of over 7½ on the figures for 1914-15. Owing to pressure put on the department by the Ministry of Munitions to provide further workmen's cars morning and evening, and also due to the great strain the motormen were suffering under in driving in the darkness, it became necessary to curtail the running of the cars in the evening. This curtailing of the hours of running reduced the earning capacity of the cars and at the same time increased the cost of running. At the same time a considerable number of additional cars were put into the workmen's service morning and evening, and Mr. Hatton thinks it may be truly said that no tramway system in this country has done so much for the conveyance of men employed on work of national importance. Notwithstanding the strenuous efforts that have been made to cope with the workmen's traffic the demands have at all times been in excess of the available supply, and the utmost difficulty is experienced in keeping a sufficient number of cars in service to satisfy reasonable demands. Mr. Hatton again records his thanks and appreciation of the services rendered to him by the volunteer drivers and conductors. Without their help it would have been impossible to maintain anything like an adequate service of workmen's cars, and he hopes the workmen in the area served by the cars fully appreciate what these men have voluntarily done for their comfort and financial gain.

Christmas Day Holiday.—Last Christmas Day numerous tramway undertakings granted a holiday to the whole of their employees in consideration of the strain entailed by carrying on the services with a reduced staff. Coventry Tramways Committee are the first to announce a similar concession for Monday, December 25 next.

RAID WARNINGS AND CAR SERVICES.

With the concurrence of the Field-Marshal Commanding-in-Chief the Home Forces, the following regulations have been promulgated for observance by all persons operating tramway services in the Metropolis during the period of threatened air raids. The police have been instructed to enforce the proper observance of the regulations :—

(1) The several authorities to be warned by telephone to take air raid precautions.
(2) Immediately on receipt of this order the several authorities are to at once communicate in an approved manner the indication to the car drivers throughout their area.
(3) The speed of all cars must be instantly reduced (by running on series only), so that the speed in no case is in excess of six miles per hour.
(4) That only one lighting circuit be used, no additional circuit being put on until the warning is withdrawn.
(5) That the trolleys be connected with and disconnected from the trolley wire in such a manner that flashing is avoided.
(6) That the drivers "throw off" at all section insulators and when passing special work, frogs, ears, etc., where flashing would be likely to occur.
(7) That tramway managers take special precautions to ensure that no defective trolley wheels are used.

The public carriage inspecting staff will co-operate with the police to enforce these regulations, members of that staff taking up the positions allotted to them as soon as the warning is received. Should the police observe any infringement of the regulations they are to stop and warn the driver of the risk occasioned by his neglect, and they will also prepare a report for the information of the Commissioner of Police.

At the request of the Commissioner of Police the Highways Committee of the London County Council have arranged a scheme for warning motormen and conductors of possible air raids. The expenditure involved in carrying out the scheme is £624. A considerable expenditure has also been incurred on this and all the tramways in the Metropolis to fit to each angle of the cars a shaded light, in compliance with the order made some time ago under the Defence of the Realm Act. Under this order all vehicles are required to display two front lamps, one on each side, and a red rear light on the off side. The dashboard lamp is not now used, and it cannot be said that the change in the exterior lighting of the cars has added to the safety of the streets. Another heavy expense has been entailed by the Lights (London) Order of August 26, 1916, which provides that the lights of tramcars must not be more than is sufficient to enable fares to be collected. On the London County Council cars it has been necessary to make alterations and additions to the wiring. The work is estimated to cost £3,020 on the County Council's cars alone.

PURCHASE OF STEEL FOR TRAMWAYS.

The secretary of the Tramways and Light Railways Association has notified the members that in making application to the Ministry of Munitions for permission to purchase steel of any description, they should supply the information in the following form instead of in the form previously set forth :—(1) Whether they are engaged in war work ; if so giving particulars ; (2) the quantity and kind of steel now required ; (3) the purpose for which the steel is required ; (4) the name of the contractor supplying the steel. A certificate from the Ministry of Munitions is now required before steel of any description and for any purpose can be obtained.

RAILS TAKEN UP TO LAY ELSEWHERE.

In connection with the proposal of Croydon Tramways Committee to relay a portion of the Selhurst Road track and to construct a double line at an estimated cost of £2,156, the borough engineer has reported that he has been unable to obtain delivery of rails. He has been informed by the Ministry of Munitions that owing to Government requirements no definite promise could be given as to permission being granted for the rolling of the quantity of rails required. The committee have advised the Corporation that, for the safety of the public, the work should be immediately carried out, and they recommended that the required number of rails should be removed from the Whitehorse Road section, which is not being operated, and utilised for the purpose, and that subject to the necessary consents being obtained the works be proceeded with. Alderman G. J. Allen, chairman of the Tramways Committee, in moving the adoption of the report, said that it would not be possible to obtain new rails until some time next year, and it would be cheaper to take up rails in Whitehorse Road and relay them in Selhurst Road. The Council agreed to that course.

Restriction of Copper Wire Manufacture.—By an order of the Minister of Munitions issued on November 4 the manufacture of copper wire is now prohibited in the United Kingdom except for the fulfilment of Government contracts or other contracts specially sanctioned.

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FINANCIAL REPORTS AND MEETINGS.

Calcutta Tramways Company.—An interim dividend on the ordinary shares of 3 per cent. is announced.

Rio de Janeiro Tramway, Light, and Power Company.—A dividend is announced of 1¾ per cent. on the capital stock.

Shanghai Electric Construction Company.—The directors announce an interim dividend of 4 per cent. (8s. per share).

Sao Paulo Tramway, Light, and Power.—The directors have declared a dividend of 2½ per cent. on common stock.

Brazilian Traction, Light, and Power Company.—The directors announce a dividend of 1 per cent. on the ordinary stock.

United Electric Tramways of Caracas.—A dividend of 7 per cent. less tax, for the past year is recommended by the board, carrying forward £2,428.

Callender's Cable and Construction Company.—The board have declared an interim dividend on the ordinary shares of 5s. per share (10 per cent. per annum).

City of Buenos Ayres Tramways Company.—The board announce a dividend of 1s. 3d. per share (5 per cent. per annum) for the three months ended September 30.

Montreal Light, Heat and Power Company.—An interim dividend is announced on the capital stock at the rate of 8 per cent. per annum, for the quarter ending October 31.

Brisbane Electric Tramways and Investment Company.—A dividend has been declared at the rate of 8 per cent. per annum (4s. per share), free of tax, on the ordinary shares for the past half-year.

Hurst, Nelson and Company.—The directors recommend a dividend of 10 per cent., together with a 2½ per cent. bonus, both free of tax. The profits were £73,426, to which has to be added £15,000 brought forward.

Interborough Rapid Transit Company.—The operating revenue for the year ended June 30 was 35,891,528 dollars, an increase of 2,457,785 dollars on the previous year, and operating expenses were 14,008,165 dollars, an increase of 1,066,851 dollars. The surplus over dividends of 20 per cent. on the capital stock was 1,892,014, a gain of 817,867 dollars over the previous year.

Mexico Electric Tramways, Limited.—At a meeting of holders of the 5 per cent. debentures, held on October 10 in London, Mr. G. S. Pott was appointed a trustee for the debenture holders in place of the late Mr. C. Rube. It was agreed that the payment of the debenture interest should be postponed until July 1, 1917. Mr. Pott, who presided, said the group of companies interested in Mexico had decided to present a united front and assist each other.

Bahia Tramways, Light, and Power Company.—The trustees have presented a report to the bondholders on the present position owing to the Municipal Council having repudiated their contract to purchase the undertaking. Sir Wm. Plender, who presided at the meeting, said that matters were now at a deadlock, for though the courts had recognised the rights of the company there seemed to be no way of effectively enforcing those rights. The Council had behaved in a manner that was a disgrace to a civilised community.

Trafford Park Estates, Limited.—The report for the year ended June 30, 1916, states that the capital expenditure, mainly on new buildings, during the year, has amounted to £128,582. About 50 acres of land adjoining the estate had been acquired by the company, and the profits amount to £30,172. With the balance of £45,070 brought forward from last year there is an available sum of £75,242. The payment of a dividend at the rate of 4 per cent. on the ordinary shares is recommended. This will require £24,890, leaving a balance of £50,352 to be carried forward.

Manaos Tramways and Lighting Company.—The report for the year ended April 30 states that the depreciation of currency has resulted in a loss of £13,093 on remittances from Manaos. The gross earnings were £110,524, as compared with £110,420, and operating expenses £76,172, against £82,240. The net operating revenue carried to profit and loss account increased from £26,180 to £34,352. After providing for debenture interest, sinking fund, interest on loan, London office expenses, sundry charges, and the loss in exchange already referred to, £1,661 is carried to the balance sheet.

London County Council Tramways.—At the first meeting of the County Council after the recess it was reported that the tramway receipts during the eleven weeks ended October 4 amounted to £554,271, an increase of £36,868 as compared with the corresponding weeks in 1915. The passengers numbered 130,814,286, an increase of 9,855,782. During the two weeks ended October 18 the receipts amounted to £98,350, an increase of £5,971 as compared with the corresponding weeks in 1915. The passengers numbered 23,414,103, an increase of 1,721,613. The total traffic receipts from the beginning of the financial year from April 1, 1916, to October 18 aggregated £1,408,250, an increase of £140,908 over the corresponding period.

Norwich Tramways Company.—At the twentieth annual meeting, held in London on October 30, Mr. Charles Pakeman (vice-chairman), presided and moved the adoption of the report, which recommended payment of a dividend of 3 per cent. for the year ended June 30, placing £5,000 to the reserve fund account, and £1,000 to the 1914 Act account, and carrying forward £428. The only point that called for comment, he said, was the large sum placed to the reserve fund account. This provision had been made because, owing to the lighting restrictions, it had not been possible during the year to carry out all the renewals that had been planned. This amount would otherwise have been largely spent on these purposes. Mr. E. A. Hopkins was re-elected as a director.

Half-yearly Results at Bradford.—The general manager on October 16 presented the appended comparative half-yearly return to the Tramways Committee :—

	1916.	1915.	Increase.
Traffic receipts (incl. parcels)	£184,572	£175,932	£8,610
Car-mileage	3,160,153	3,143,156	16,997
Receipts per car-mile ...	14·01d.	13·43d.	·58d.
Units consumed	6,228,912	6,097,351	131,561
Units per car-mile	1·971	1·939	·032
Passengers carried	40,148,066	37,975,411	2,172,655
Wages on revenue account, including permanent way	£75,332	£69,346	£5,986

Auckland Electric Tramways.—Mr. C. G. Tegetmeier, presiding at the ordinary general meeting of this company on October 31, said that in spite of adverse conditions the traffic receipts for the year ended June 30 showed an increase of £6,989 over the preceding year, the total being £274,783, or at the rate of over £10,000 per route mile. The number of passengers carried was 42,352,000, an increase of nearly a million. The receipts had increased by nearly 3 per cent. notwithstanding that a large proportion of the male population of Auckland had left industrial pursuits to share in the defence of the Empire. Concessions from various suburban authorities expired at various dates from 1934 onward, and the terms of purchase were favourable to the company, being based upon the value of their undertaking as a going concern.

Mexico Tramways, Light and Power Group.—Sir Alex. Roger presided at a meeting of the holders of 5 per cent. first mortgage gold bonds of the Pachuca Light and Power Company, held on October 5, when resolutions were passed for the purpose of giving effect to the policy approved at the joint meeting of holders of the various bond issues of the Mexico Tramways, Light and Power group of companies held on July 14 last. The chairman said it was important that all the companies should stand together for mutual protection. The policy laid down was a temporary expedient to bridge over the present conditions in Mexico. Affairs in that country had not improved since July, and it seemed unlikely that any permanent stability would be reached unless some form of intervention and financial control was introduced.

Belfast Tramways Half-yearly Report.—For the six months ended September 30, the working of the Corporation Tramways undertaking shows a surplus profit of £3,883, as against £8,380 for the similar period of 1915. The revenue was £151,980, as compared with £141,580, an increase of £10,400. There was no appreciable increase in car mileage. The receipts per car mile were 11·58d., as against 11·01d. for the corresponding period of 1915. The average receipts per car mile for September was the highest yet reached—viz., 11·93d., while the working expenses were also a record—7·03d. The increase in the revenue is balanced by a rise of £11,000 in the expenditure, the aggregate being £89,723, as against £78,189 for the same period in 1915. The increased expenditure is due to higher payments for wages, war allowances, sinking fund, income tax, track and car maintenance, and electrical energy, the latter total being £20,824, as compared with £14,649 in the corresponding period. Wages increased by £2,000, and allowances from £3,700 to £4,400. Car works expenditure is up by £1,800, and permanent way and electrical equipment by £1,300.

Birkenhead Corporation Tramways.—Mr. C. Clarke, general manager, in the fifteenth annual report, states that in his last annual report, which included the first eight months of the war, he recorded a decrease in the receipts of £2,715 for the eight months, as compared with the pre-war period. The traffic had since so far improved that for the past year the income amounted to £72,820, or £4,212 higher than ever previously recorded. The working expenses amounted to £38,833; sinking fund, income tax, etc., £23,417; balance £10,570, which had been allocated as follows :—In aid of rates £4,000, reserve fund £2,000, renewals fund £4,570. The reserve fund stands at £3,040; the renewals fund £27,397. The price of current had been raised from ·953d. to 1·053d. Revenue per car mile averaged 14·84d. and working expenses 7·91d. War allowances to dependents of employees amounted to £1,589, and war bonus to £884. Up to date 67 employees had volunteered, and five had been killed. The female employees had carried out the work of cleaners and conductors satisfactorily. The collections on the cars for war charities amounted after 34 weeks to £2,093.

Dundee and District Tramways Company.—In moving the adoption of the report at the thirteenth annual meeting, Mr. George Balfour stated that the receipts amounted to £11,825, a decrease of £1,468. There was a decrease in the number of passengers of 125,929. The

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very severe lighting restrictions affected the volume of local traffic —the short-distance travelling in and between Broughty Ferry and Monifieth—while this was further adversely affected by the unfavourable weather during the early summer. The receipts this year to date showed a considerable improvement. A total of £15,540 debenture stock had been redeemed at July 31 last. The directors proposed to apply each year the interest on redeemed stock in purchasing further stock until the whole had been paid off. This was, in his opinion, the soundest form of providing for depreciation, viz., by actual cash repayment of capital indebtedness out of profits. In his opinion, immediately normal conditions prevailed the company would earn as large or even a larger profit than in any previous year. He moved that a final dividend at the rate of 6 per cent., less income-tax, be paid on preference shares for the past half-year. Lieutenant Hynd and Mr. E. Cowan were re-elected directors.

Record Nine Months at Liverpool.—In responding to a vote of thanks at the final meeting of Liverpool Tramways Committee for the municipal year, Mr. Russell Taylor, the chairman, said that the past nine months had been a record for the tramways as regarded the receipts and the number of passengers. The increase in the receipts had been £27,547, and in passengers 4,451,477. The mileage had decreased by 56,044, and the earnings per car mile had increased ·76d. That statement would convey something of the great carrying capacity of the cars. The department had been handicapped owing to the war in many directions. The greater part of the staff had joined the army, and the manager had had to supplant them by inexperienced men and women. At the end of the year the balance sheet might not be as satisfactory as some of them would like it to be, as they had considerable additional expense owing to army allowances and war bonuses, and increased outlays in other directions. The reduced lighting of the cars had been responsible for some inconvenience to passengers, and owing to the shortage of labour the service was not kept up as efficiently as the manager would like. He had to ask the public still to endure the inconvenience.

Cape Electric Tramways.—The report for the year ended June 30, 1916, shows gross earnings of £212,792, an increase over the previous year of £6,669. The profit on the Cape Town and Port Elizabeth Tramways amounted to £81,877 ; interest on investments, £2,301 and transfer fees £12, making a total of £84,190. General and office expenses amounted to £1,480, income tax provision and excess profits duty on profits to June 30, 1915, £8,359, interest and exchange £388, directors' fees £1,300, trustees' fees £166, leaving a balance of £72,497. After providing for debenture interest, redemption of debentures, and taking into account the balance brought forward from last year, there is a net credit balance of £31,404. A sum of £5,000 has been placed to reserve, leaving a balance of £26,404. The directors recommend the payment of a dividend for the year of 3¾ per cent. on the ordinary share capital, and this will absorb £18,421, leaving a balance to be carried forward to next year of £7,983. The passengers carried during the past year totalled 22,477,366, as against 21,680,070. A small improvement in traffic receipts was more than counterbalanced by the increased cost of operation due to labour charges and allowances granted to employees who have joined the forces. Excess profits duty and increased income tax charges have also had to be met.

Portsmouth Corporation Tramways.—The importance of the tramways in the great naval centre is indicated by the increases in the number of passengers during the past two years, although during each period the shortage of staff led to reductions in the car mileage, especially in the past year. While in 1915-16 there were nearly two million more passengers, the mileage decreased by 267,843 miles. The improved result shown in the appended tabular statement was achieved in spite of the concession in May, 1915, of issuing books of 16 tickets for a shilling and eight for sixpence and the lengthening of the fare sections. The books give a reduction of 25 per cent. on ordinary fares.

Year ending March 31,	1916.	1915.	1914.
Capital expenditure	£733,181	£731,174	£772,684
Amount outstanding	£396,624	£423,103	£449,206
Traffic revenue	£126,324	£121,909	£115,168
Total revenue	£127,546	£123,991	£116,991
Working expenses	£59,301	£56,888	£57,620
War allowances	£2,778	£1,770	—
Gross balance	£65,467	£65,333	£59,371
Net profit	£23,278	£22,568	£18,702
Passengers carried	29,338,918	27,554,194	26,266,342
Fare per passenger	1·033d.	1·061d.	1·052d.
Car mileage	2,170,778	2,438,621	2,506,058
Units per car mile	1·238	1·139	1·103
Power cost per car mile ...	·760d.	·549d.	·576d.
Traffic receipts per track mile	£3,650	£3,535	£3,325
Traffic receipts per car mile	13·966d.	11·998d.	11·030d.
Expenses per car mile ...	6·556d.	5·599d.	5·518d.
Ratio of working expenses ...	46·49	45·88	49·25
Total track mileage	34 m. 48 c.	34 m. 48 c.	34 m. 51 c.
Number of cars	100	100	100

DICK, KERR & COMPANY, LTD.

A Prosperous Year.

The ordinary general meeting of the shareholders of Dick, Kerr and Company, Limited, was held on Thursday, October 26, at the Cannon Street Hotel, London, E.C., Mr. Claud T. Cayley, chairman of the board of directors, in the chair, supported by Mr. R. H. Prestwich, deputy chairman, Messrs. D. C. Ellis, J. Sampson, T. D. Lingard, directors, and Mr. Walter Rutherford, managing director.

The Secretary (Mr. E. D. Johnson) read the notice convening the meeting and the auditors' certificate.

The Chairman, in submitting the directors' report and statement of accounts, said the past year had been a strenuous one for everyone connected with the management of the company. At the last meeting he had indicated as far as advisable the nature of the work on which they were then employed and expected to be engaged in during the period under review. As shown to some extent by the balance sheet, the work actually undertaken had been of greater magnitude than the directors had anticipated. He was not permitted to give details, but it would suffice to say that both the manufacturing department and the new contracts department were dealing with a larger turnover than ever before, and in his opinion it was greatly to the credit of the staff that this should be the case in view of the extent to which it had been depleted by many members having joined the forces. The balance sheet showed that " capital expenditure at the works, including goodwill and patents," had been reduced. This might be misleading in view of the evident material extensions. The explanation, however, was to be found in the item, " contracts due for work, stock of materials, etc." It was considered for the purpose of comparison better to keep the expenditure in connection with abnormal works separate, and this had been done by dealing with them as separate and independent contracts. When they returned to normal times there would of necessity be an adjustment, but it was no use attempting to make that adjustment now, as under the Munitions Act the Government would have a very considerable say as to how it should be carried out. The reduction in " capital expenditure, etc., at works " of over £18,000 roughly represented the amount written off for normal depreciation. The auditors stated " No provision has been made for the shrinking of assets due to the present exceptional circumstances, but the usual charges for depreciation had been made." That was correct so far as the balance sheet was concerned, but he drew attention to certain words in the profit and loss account, i.e., " after setting aside reserve for extra depreciation." Everyone experienced in manufacturing knew that depreciation of machinery increased with the time it was at work but not in direct proportion. The more continuously machinery was operated the less time there was to carry out normal repairs ; consequently the life was shortened out of all proportion to the actual amount of time worked, and the directors considered it necessary to provide amply against this exceptional wear and tear. The year's profit added to the sum of £18,346 brought forward gave £79,296 available for appropriation. Out of this it was proposed to add £25,000 to " special reserve for contingencies," which would bring the total of that reserve up to £50,000. The work on which they were engaged was abnormal in great part, and a transition period was bound to come when all their energies would have to be directed to re-establishing normal conditions. It was therefore sound policy to build up a reserve to help them over that transition period. It was impossible to say much about war taxation, except that a sum had been reserved in the accounts which was considered sufficient to meet any claims.

Advantage was taken during the year of an opportunity to acquire a controlling interest in the shares of Messrs. Willans and Robinson, with whom they had done a large business and had had pleasant relations. It was not proposed to make any alteration in the present directorate and management of that firm, and it would be recognised that there was now no obstacle to cementing their relationship by closer combination of working interests, leading eventually to material benefits to both. It had been a great satisfaction to the board to see the mobile manner in which the staff had thrown themselves into the work of re-organisation to meet an entirely new class of manufacture, and with no little success under very adverse circumstances. He attributed the success attained, both at their own works and the new factory, to the fact that they were able to provide the nucleus from old employees, and in this connection he wished not only to include members of the staff, but foremen and workmen alike. In these days, when so much was said about slacking and loss of time, it was pleasant to be able to state that the time lost by their workers at Preston from all causes, illness included, over the year under review was under 1·4 per cent. This included men and women, forge and machine shops. He was not inclined to prophesy as to the future any more than he was two years ago, but he was prepared to say now that with such a staff as theirs had proved itself to be, that given reasonable protection of a permanent nature against unfair competition from outside the Empire, there was every reason to look to the future with confidence. He thought that on examining the balance sheet they would agree that under all the circumstances the business had been most satisfactorily carried on. He moved the adoption and confirmation of the 6 per cent.

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dividend on preference shares already paid and the 6 per cent. dividend on ordinary shares. (Applause.)

Mr. R. H. Prestwich, deputy chairman, formally seconded the motion.

Some questions were asked as to several items in the accounts, and three or four shareholders warmly congratulated the board of directors on the results of the year's working. Much satisfaction was also expressed that the company, after five years, again ranked in the list of dividend paying concerns.

The Chairman, replying, disposed of the questions satisfactorily, and said that as regards contracts in hand the shareholders could rest assured the directors were not going along with their eyes shut as to the future when the war was over. They were now doing an enormous business. The goodwill was not now separately stated in the accounts, but it had not been increased. He was not free to make any definite statement as to stocks, but there was no danger or risk in that respect. The directors were keenly looking after the interests of the company, and he might remind them that they were largely represented in the share capital. The managing director had given most careful attention to organisation, and they had before them the names of the management committee. The business was naturally divided into departments, over each of which was one man responsible to the managing director, who in his turn was responsible to the board. They had proceeded on what they regarded as a fair and proper basis, and were convinced that their customers were extremely satisfied with all that the company had done. (Applause.)

The motion was then agreed to unanimously, and the retiring directors, Messrs. R. H. Prestwich and T. D. Lingard, were re-elected on the proposition of the chairman, seconded by Mr. D. C. Ellis.

The auditors, Messrs. Gane, Jackson, Jefferys, and Freeman were re-elected, and in acknowledgment Mr. Freeman warned the shareholders that under existing circumstances they must not expect the accounts would be ready quite so early next year.

The Chairman proposed a hearty vote of thanks to Mr. Walter Rutherford, the managing director, and the staff for their successful conduct of the company's business, and this having been acknowledged, a similar compliment to the chairman and board of directors closed the meeting.

The report for the year ended June 30 shows a notable improvement on the previous year. The profit earned during the past 12 months amounted to £71,740, an increase of £24,781. This enabled the directors to make all necessary provisions and to recommend a dividend of 6 per cent. on the ordinary share capital, while carrying forward a balance of £20,397. A comparison of the figures for the past five years is appended :—

	1916.	1915.	1914.	1913.	1912.
	£	£	£	£	£
Net profits	71,740	46,959	44,761	30,092	3,275
Balance from last year ...	18,347	25,526	10,325	10,016	36,892
	90,087	72,485	55,086	40,108	40,167
Debenture interest and trustees' fees	10,490	10,538	10,961	11,183	11,551
Premium on debenture stock redeemed ...	300	300	300	300	300
Dividend on 6 per cent. preference shares ...	18,300	18,300	18,300	18,300	18,300
Dividend on 6 per cent. ordinary shares ...	15,600	—	—	—	—
Reserve against contingencies	25,000	25,000	—	—	—
Balance carried forward	20,397	18,346	25,525	10,325	10,016

PURCHASE OF A.E.G. COMPANY BY DICK, KERR AND COMPANY, LIMITED.

The A.E.G. Electric Company, one of the three subsidiaries in this country of the Allgemeine Elektricitats Gesellschaft of Berlin, has been sold by the controller appointed by the Board of Trade to Dick, Kerr and Company, Limited. The company was the most important of the three subsidiaries, and had offices and works in London, Newcastle, Cardiff, and Birmingham. One of the reasons advanced for the continuance of its operations after the outbreak of war is understood to have been the importance of the work it had undertaken for firms engaged on Government contracts. The liquid assets held in this country amounted to over £100,000. As these assets are now transferred to the Public Trustee practically all that was saleable, apart from stock, was the goodwill, and as the company's profits have fallen off during the war, the price paid was not large. Before the war the company employed a great number of German workmen, and the whole of the capital was held by the parent company in Berlin. During the war the German staff has been replaced by a British staff, and the latter is now taken over by Dick, Kerr and Company, together with a number of uncompleted contracts.

CONTRACTS AND ORDERS.

Siemens Brothers' Dynamo Works have an order from Paisley Council for a high-tension switchboard.

Yarmouth Tramways Committee have accepted the tender of a local firm for 40 oilskin overcoats at 16s. 6d. each.

Ford Motor Company (England), Limited, have a contract to supply motor delivery vans to the War Department.

Croydon Council have purchased a high-tension feeder cable from Callender's Cable and Construction Company, Limited.

Edgar Allen and Company are supplying special trackwork for the Wolverhampton and Manchester Corporation Tramways.

The Motor Rail and Tramcar Company, Limited, recently supplied a number of petrol tractors and parts to the War Department.

C. A. Vandervell and Company, Limited, of Worple Way, Acton, W., have received a contract to supply magnetos to the War Department.

Halifax Council have a contract with Arden Hill and Company, Birmingham, for the supply of an armature drying oven for the car depot.

Bradford Tramways Committee have made a purchase of cloth from R. Gaunt & Sons, Limited, Farsley, for uniforms for the employees.

Manchester Tramways Committee have accepted the tender of the Frances Motors, Limited, for a Ford motor van for the parcels department.

Messrs. Johnson Brothers and Company, of Ford Road, Bow, E., have an order from the London County Council for 1,450 oilskin coats for motormen.

Sunderland Council have accepted the tender of Everett Edgcumbe and Company for surge arresters, and of W. T. Henley's Telegraph Works, Limited, for cable.

Ilford Coal Contract.—Under the Price of Coal (Limitation) Act, the coal contractors to Ilford Urban Council have raised the price for Welsh coal by 2s. 6d. per ton.

Chatteris Engineering Company, Limited, have a contract from Sheffield Corporation for converting to electrical working a 20-ton overhead travelling crane at a cost of £902.

Glasgow Tramways Committee have placed a contract with Pirelli, Limited, for vulcanised india-rubber cable, and W. Miller and Company for chilled iron brake blocks.

The Highways Committee of the London County Council have placed an order for the supply of car axle oil for the tramways department with Worringham and Company, Deptford.

The War Office have placed a contract with Mr. W. Jones, Upper Thames Street, E.C., for the supply of tramway track, and with the Wantage Engineering Company, Limited, for rail trolley parts.

Messrs. Briggs, Jones and Gibson, Limited, have a contract to supply uniform clothing to Wolverhampton Corporation tramway inspectors, motormen, and male conductors for twelve months, at £2,104.

The Mirrlees Watson Company, Limited, Glasgow, have recently received orders for 34 sets of condensing plant, practically all for war service work, and of varying steam duties up to 130,000 lbs. steam per hour.

Shepherd's Parging Block Company, Limited, of Rochdale, have received an order for the supply of their block parging to the Bexley Council Tramways, Rochdale Corporation Tramways, and Rhondda Valley Tramways.

Thomas Tilling, Limited, have been awarded the contract by London County Council for the supply of horses for drawing trailer cars to and from the depôt of Evelyn Street, at the rate of £145 a horse a year.

Newcastle Corporation have accepted the only tender received for the supply of coals. It was from the present holder, who would only contract for six months at 2s. per ton extra, this sum being for the cost of carting.

Johannesburg Council have allotted the following contracts :— Telegraph Manufacturing Company, five miles of trolley wire ; Bruce, Peebles and Company, Limited, 2,000-K.W. La Cour motor converter and spares.

Rotherham Council have accepted the offer of the British Westinghouse Company to supply a 5,500-K.W. turbo-alternator at £23,700, and of the British Niclausse, Limited, for the supply and erection of two water-tube boilers at £13,250.

Liverpool Corporation have adopted the recommendation of the Tramways Committee to purchase women conductors' overcoats from J. Hunter and Son, Limited, Liverpool, and costumes from Coop and Company, Limited, Liverpool.

Wolverhampton Council have given an order to Messrs. Melville, Dundas and Whitson to supply and fix a crane gantry at the electricity works, and to Gibbons Brothers, Limited, for a steel roof to the boiler-house of the generating station.

Tramway Material for London County Council Tramways.—Orders for tramway material and the execution of small works and repairs, at an estimated cost of £38,110, arranged by the Highways Committee, have been approved by the Council.

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Tudor Accumulator Company have agreed to an extension for twelve months of their contract for maintaining the batteries of two ambulance vehicles belonging to the Metropolitan Asylums Board, which are used at Queen Mary's Hospital.

Luton Council have been recommended by the Electricity and Tramways Committee to place a contract with Messrs. Herbert Morris, Limited, for an electric overhead runway and two skips for the removal of ashes at the generating station.

Lifting Jacks.—Manchester and Blackpool Tramways Committees have given an order for car lifting jacks to the Equipment and Engineering Company, of 2 and 3, Norfolk Street, London, W.C. The Blackpool Authority intend to place a jack on each car.

Barking Council have accepted the following tenders :—Siemens Brothers' Dynamo Works, extra high tension cable, £1,913 ; General Electric Company, switchgear, £888 ; Brush Engineering Company, transformer, £611 ; Babcock and Wilcox, chain-grate stoker.

H. Lotery and Company, Limited, whose contract of November 30, 1915, for uniform clothing for the parks department of the London County Council has been reconsidered, have been granted a new contract as from January 1, 1917, at slightly increased prices.

Derby Corporation have made the following contracts :—R. Wade and Sons, tramway standards ; British Thomson-Houston Company, switchgear and extension of switchboard ; British Electric Transformer Company, two transformers ; British Insulated and Helsby Cables, Limited, armoured and copper cable.

Rotherham Tramways Committee have purchased 60 motormen's oilskins at 27s. each and 60 conductors' mackintoshes at £1 11s. 6d. each from Tasker, Son and Company. Stores for the tramways and electrical departments will not be contracted for during the ensuing year, but purchases will be made as required.

Sheffield Corporation have placed the following contracts for the supply of spare apparatus for the auxiliary plant at Neepsend Station :—Siemens Brothers' Dynamo Works, motors and transformer ; Dick, Kerr and Company, British Westinghouse Company, and Fuller Electrical Company, motors ; Igranic Electric Company, motor starters.

Victorian Railway Commissioners have placed the following contracts :—Motor generator, etc., for battery charging of baggage trucks, switchboard and connections, Electric Construction Company, Limited ; electric lamps for signal system, Edison-Swan Electric Company, Limited ; lampholders for signal system, Australian General Electric Company.

Switchgear for London County Council Tramways.—The offer of the British Westinghouse Electric and Manufacturing Company, amounting to £2,964, for the alteration of existing low tension wiring and the provision of a portion of the switchgear for the third additional turbo-generator to be installed at Greenwich generating station, London County Council Tramways, has been accepted.

Three Years' Contract for Uniforms.—Blackburn Council have adopted a recommendation by the Tramways Committee to enter into a three years' contract for the supply of uniforms. Councillor Higham, vice-chairman of the committee, stated that there had been great difficulty in obtaining uniforms during the war, and if the conflict ended to-morrow there would be no drop in prices for a considerable period.

Salford Council have accepted the following tenders :—I. Bentley and Company, Limited, Manchester, supply and delivery of oil and paints required by the tramways department during the six months ending March 31, 1917 ; British Westinghouse Company, Limited, blank cubicle with high-tension switchgear and control panel for the rotary converter recently supplied by the company ; J. Heaton, Ramsbottom, 2,500 tons of Tyldesley slack at 17s. 11d. per ton.

Castings for Permanent Way.—Ninety firms were recently invited by the London County Council to tender for steel and iron castings for permanent way for the tramways department. The following are the successful tenderers :—Hadfields, Limited, East Hecla Works, Sheffield ; Robert Hyde and Son, Limited, Abbeydale Foundry, Sheffield ; John Needham and Sons, Limited, Millgate Foundry, Stockport ; and Samuel Osborn and Company, Limited, Clyde Steel Works, Sheffield. Some iron castings will be supplied by R. A. Bradshaw and Son, Retford.

Manchester Corporation have placed the following contracts :—Grange Iron Company, Limited, ash hopper ; Etchells, Congdon and Muir, Limited, hoist gear, etc.; Aiton and Company, Limited, steam and feed pipes and supports, including alterations to existing pipework to two boilers ; Avonside Engine Company, Limited, Bristol, saddle-tank steam locomotive ; R. White and Son, Widnes, second-hand railway material ; F. W. Brackett and Company, Limited, water screen ; F. Mitchell and Son, Limited, foundations for wagon lift and turntable ; British Thomson-Houston Company, Limited, switchgear and switchboard ; Mather and Platt, Limited, electrically-driven circulating water-pump ; Ferranti, Limited, extension switchgear, etc.; Stewarts and Lloyds, high-pressure pipework ; cables—Callender's Cable and Construction Company, Limited ; British Insulated and Helsby Cables, Limited ; Pirelli General Cable Works, Limited ; C. Macintosh and Company, Limited, Johnson and Phillips, Limited.

PERSONAL.

Mr. A. C. Swales has relinquished the secretaryship of the Junior Institution of Engineers, owing to ill-health.

Mr. L. Slattery, the new general manager of West Ham Corporation Tramways, entered fully upon his duties on November 1.

Mr. L. E. Harvey, general manager, Ilford Council Tramways, has been granted an increase in salary from £460 to £480.

Mr. W. W. Bell, chief clerk, Yarmouth Corporation Tramways, has been granted a bonus of £10 per annum during the war.

Mr. A. M. Simpson has been appointed general manager of the Malta Tramways Company's undertaking in Valetta and district.

Colonel Sir H. C. L. Holden, director of mechanical transport at the War Office, has been elected upper warden of the City Guild of Gunmakers.

Mr. J. C. Williams, electrical engineer and tramway manager of the Erith Urban District Council, has been granted £50 for extra services rendered since his appointment.

Chief Inspector A. W. Baker, Doncaster Corporation Tramways, has been appointed traffic superintendent, filling the vacancy caused by the resignation of Mr. A. M. Strachan.

Mr. G. R. Archdeacon, who has been appointed general manager of the Canadian Hart Accumulator Company, was formerly with Messrs. Ferranti, Limited, and the Chloride Electrical Company.

Mr. Harry Lotery, of Messrs. H. Lotery and Company, Limited, uniform clothing contractors, of 4 to 8, St. Mary Street, London, N.E., has been elected a member of the Stepney Borough Council.

Councillor J. Harrison, convener of the Tramways Committee of Edinburgh Corporation, is mentioned as one of four probable candidates for the impending vacancy in the Lord Provostship of the city.

Mr. J. M. McElroy, at the request of the Board of Trade, has been granted permission by the Manchester Tramways Committee to act as referee to determine the disagreement between Bacup and Rawtenstall Corporations as to fares and stages on the tramways.

Mr. F. Golding, assistant electrical engineer in the Postmaster-General's Department, New South Wales, has been appointed electrical engineer for Victoria. He succeeds Mr. A. A. Dircks, who has become electrical engineer to the Government of New South Wales.

Alderman J. H. Hargreaves, who was selected as Lord Mayor of Hull for the fourth year, has declined the honour owing to ill-health. During the present year his lordship resigned the position of chairman of the Tramways Committee, which he had held for a number of years.

British Thomson-Houston Company, Limited.—At a recent board meeting of this company, the managing director, Mr. H. C. Levis, was appointed chairman in succession of Mr. J. F. Nauheim, who has retired. Mr. Levis retains the managing directorship of the company.

Mr. Conway, who has held important positions in various light and power companies, has proceeded to Mexico at the request of the committee who are acting in the interest of the Mexico Tramways, Light and Power group of companies, owing to the unsettled condition of that country.

Sir Wm. Clark has been appointed comptroller-general of the Department of Commercial Intelligence of the Board of Trade, which has been formed by the amalgamation of the Commercial Intelligence and Exhibitions branches of the Board. **Mr. T. Worthington,** who has just retired from the post of director of the Commercial Intelligence Branch, will assist the new department in a consultative capacity as commercial adviser.

Mr. Cyril W. Goodman, a son of Mr. W. G. T. Goodman, engineer and general manager of the Adelaide Municipal Tramway Trust, has been awarded the Angas engineering scholarship by the Council of Adelaide University. The scholarship is of the value of £200 per annum, and is tenable for two years. Mr. C. W. Goodman was graduated from the University last year as a bachelor of engineering. He has since enlisted for active service.

Mr. A. W. Talt, a member of the committee appointed by the Board of Trade to inquire as to the measures to be taken to safeguard the metal trades after the war, is chairman of the British Aluminium Company, Ferranti, Limited, Llandudno and Colwyn Bay Electric Railway, Delhi Electric Tramways and Lighting Company, Fraser and Chalmers, the Russian Corporation, and the Metropolitan Electric Supply Company. He is also a director of Barbados Electric Supply Corporation, Bruce Peebles and Company, and Falkirk and District Tramways Company.

Mr. J. S. D. Moffet received a congratulatory vote from West Ham Council on the occasion of his departure to take up the duties of general manager of Belfast Corporation Tramways. The Corporation also approved of the Tramways Committee's suggestion

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that he should be presented with a testimonial on vellum under the Corporation seal, placing on record their appreciation of Mr. Moffet's successful management of the undertaking during his three years' service, and also the satisfactory manner in which the track repairs and the re-modelling and reconstruction of the cars had been carried out.

Mr. Adam Gowans Whyte, Editor of "Electrical Industries," is the author of a recently published novel, "The Correct Thing." As a reviewer in *The Times* remarked, "there is real fibre and thought in the book and a good deal of literary power." The dialogues of the characters, to which the author has evidently devoted much care, show unusual discernment and insight, and they add not a little to the interest of the story. An earlier novel by Mr. Whyte, "The Comedy of Ambition," was highly commended by some eminent critics, and won the praise of many whose literary tastes are not easily satisfied.

Mr. F. Schofield, general manager, Leyton Council Tramways, has lately been a victim of a false statement that he is a German. Councillor F. M. Read, chairman of the Tramways Committee, writing to the local newspapers, says:—"The sole basis of this wicked lie is that the manager's name is Schofield, which is as good an English name as any in the country. For hundreds of years Englishmen of the name of Schofield have lived in Lancashire and Yorkshire. Mr. Schofield was born in the latter county, and resided there until he came to Leyton about eleven years ago. His two sons are officers in the British Army."

Mr. W. Gordon Davies, traffic manager of the Chatham and District Light Railways Company, has died.

The late Sir George Franklin, of Sheffield, besides being on the board of many telephone companies, was a director of the Lanarkshire Tramways Company and the British Thomson-Houston Company.

Mr. W. Barfoot, J.P., of Leicester, who died at Bournemouth on October 17, at the age of 89, was one of the chief promoters of the old horse tramways companies in Leicester and Derby, which were purchased by the respective Corporations on the expiration of the original concession under the Tramways Act of 1870.

Sir Joseph Beecham, Bart., who died suddenly on October 23, was an alderman of St. Helens Corporation, chairman of their Electricity and Tramways Committees, and a director of the Lancashire Light Railways, Lancashire United Tramways, South Lancashire Tramways, and West Cumberland Electric Tramways Companies.

WITH THE FORCES.

Captain V. Smith, borough surveyor of Chesterfield, who is serving in the A.S.C., has been gazetted major.

Corporal J. Richardson, of the York Tramways Electricity undertaking, has been congratulated by the Corporation on receiving the award of the Military Medal.

Lieutenant W. H. Kember, South Lancashire Regiment, of Bolton, who is reported wounded, was formerly engaged at the British Westinghouse Works, Manchester.

Second Lieutenant A. R. Courtenay, until recently acting manager of the publicity department of the General Electric Company, Limited, has been promoted to lieutenant. After nine months' service in Egypt and Salonika he was invalided home with dysentery, but has now recovered.

Oldham Employees' War Distinctions.—Sergt.-Instructor Hope Travis, an enlisted employee of Oldham Corporation Tramways, has gained the Distinguished Conduct Medal, and Company-Sergt. Major J. Holmes, another former employee, has been recommended for the same distinction.

Lieutenant R. G. Collinson, assistant borough engineer, Swansea, has been appointed to fill the post of borough engineer, rendered vacant by the retirement of Mr. R. H. Wyrell at a salary of £800. The Corporation have applied for his release from the army, which he entered as a sapper in the Royal Engineers in 1914, and was subsequently given a commission.

Private R. Gardener, a former employee of the Bristol Tramways and Carriage Company, has been awarded the Military Medal for "bravery and untiring energy while carrying out his duties as battalion runner during the attack and after the capture of the German trenches at the —— Redoubt on August 22-23, 1916." He took several messages under heavy shell fire.

Mr. W. E. Riche, secretary of the Roads Improvement Association, has joined the Artists' O.T.C., and the Council of the Association have appointed Mr. J. D. Haworth, of the firm of Messrs. Tulloch and Haworth, consulting and civil engineers, 28, Victoria Street, as acting secretary during Mr. Riche's absence. Communications to the R.I.A. should be addressed to 15, Dartmouth Street, S.W.

Captain Leo Myers, a director of the Auckland Electric Tramways, joined the army as a private in the early days of the war. At a meeting of the Auckland Electric Tramways recently the chairman said that Mr. Myers had worked his way up to commission rank, and he was sure that the shareholders would join the board in congratulating him on his appointment to a position on the Home Staff.

Second Lieutenant T. Higgins, R.E., engineering assistant in the borough surveyor's and tramway engineer's office, Leicester, has been awarded the Military Cross for the following action, as described in the *Gazette*:—"He persisted in the consolidation of the captured trenches under intense shell fire. Later he volunteered to assist the infantry by carrying up material, and made several journeys through a heavy barrage."

Captain S. W. Carty, formerly of the electrical department of Liverpool Corporation Tramways, is one of the officers mentioned as deserving of special notice and commendation by General Reginald Wingate, Sirdar and Governor-General of the Soudan, for their services in the operations in Darfur. Captain Carty had charge of the motor transport supply column, A.S.C., and for his successful carrying out of a very difficult task he was promoted to captain.

Private W. Lorimer, on October 21 arrived in Glasgow, after having spent two years as a prisoner of war in Germany, having made an adventurous escape. When war broke out he was a conductor in the employment of Glasgow Corporation. He was called up on August 5, 1914, landed in France eight days later, and was taken prisoner, along with 450 others, on August 27. He states that but for supplies from home they would have been starved to death.

Lieut. C. Basil Harness.—Many of our readers will be interested to hear that Mr. Albert Harness, of the India-rubber Products Company, Limited, of Liverpool, has received news that his brother, Lieutenant C. Basil Harness, of the Middlesex Regiment, now attached to the King's Royal Rifle Corps, who was in Egypt for some considerable time, has now been transferred to the Salonica forces. Before joining his original battalion he was associated with the Goodrich Tyre Company, and was the managing director of the South African branch of the Prowodnick Company of Riga.

Sergeant D. S. Greenhill, late of the Rugby staff of the British Thomson-Houston Company, has died of wounds received in action.

Second Lieutenant A. F. E. Prescott, Liverpool Regiment, who has been killed, was formerly on the staff of Liverpool Corporation electricity department.

Corporal L. Davies, who has been killed at the front while at work with the Royal Engineers, was formerly on the laboratory staff of the British Thomson-Houston Company.

Second Lieutenant J. R. Moore, Connaught Rangers, who was killed in action on September 9, was in the employ of the British Westinghouse Company at Trafford Park at the outbreak of the war.

Sergeant H. W. Atkinson, Duke of Wellington's West Riding Regiment, who has been killed in action, was a traveller for the United Electric Car Company. At the time of his enlistment he was 43 years of age.

Captain Hugh McKean, Manchester Regiment, of Norwood Hill House, Surrey, late general manager of the Ceara Tramway Light and Power Company, Foetaleze, Brazil, who was killed in action on July 7, left estate valued at £36,344.

Captain J. H. Llewellyn, who represented the Stern Sonneborn Oil Company at Hereford and in the West of England, has died. On the outbreak of war he enlisted in the Yeomanry, and was soon transferred to commissioned rank in the King's Shropshire L.I.

RAILWAY OFFICERS AND STAFF.

Sir W. Guy Granet, general manager of the Midland Railway, has been appointed deputy director-general of military railways in the War Office.

Mentioned in Despatches.—The following officers of the Soudan Government Railways are mentioned in the Governor-General's despatches on the suppression of the rising in Darfur last year:—Mr. C. J. H. Hunter, district traffic manager; Hon. H. G. G. Pelham, assistant traffic manager; Mr. F. G. A. Pinckney, district engineer; Mr. G. R. Storrar, district engineer.

Colonel Sir Eric Geddes, of the Railway Staff Corps, Royal Engineers (T.F.), was on October 26 gazetted temporary major-general. This former deputy general manager of the North Eastern Railway last year became deputy director-general of the Ministry of Munitions, and on Mr. Lloyd George leaving that department he took Sir Eric with him to the War Office to make a report generally on transport service. Subsequently Sir Eric was appointed director-general of military railways in the War Office, and it has since been announced that the Commander-in-Chief of the British Army in France has appointed him inspector-general of transportation with that force. Major-general Geddes will hold both appointments.

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TRAMWAY AND LIGHT RAILWAY NOTES.

BIRMINGHAM.

CURTAILED SERVICES DUE TO A POWER STATION BREAKDOWN.

In consequence of a breakdown at Nechells power station, the Birmingham tramway services were curtailed for nearly three weeks from October 10. The normal services were run until 7.30 a.m., but from that period until 9.30 a.m., and again between 5 and 6.30 p.m., there were restricted services. Many passengers resorted to the railways. In a report presented to the City Council on October 17 the Electricity Committee stated that the interruptions of the supply during the past 18 months were due to the strain imposed by munition establishments. The boilers were designed for a low grade of fuel; the heavy load could only be met by forcing them and by the employment of higher grade fuel. Councillor Harrison Barrow, chairman of the Tramways Committee, criticised the Electricity Committee, and said that if the 1913 scheme had been carried out the difficulties would not have arisen. In three days alone the tramways lost nearly £2,000. On October 12, 1915, the service, he said, was shut down for an hour, the difficulty being caused through a shortage of coal, which could not be got at because it was on the other side of the canal. He had men sent from the Tramways Department to move the coal. On September 26, 1916, having been told the previous day that unless men were sent the Electric Supply Department would have to shut off part of the tramways load, 30 men were sent, and were told they were not wanted. Later, the manager was informed that unless 40 men were sent immediately the tramway supply would cease. As temporary remedies he now suggested that some manufacturers should be asked to revert to summer time and arrange the dinner interval an hour earlier; other factories might be induced to work at night. The reply of Alderman Jephcott, chairman of the Electricity Committee, was to the effect that there was an arrangement between each committee as to the emergency gang.

BLACKPOOL.

A JACK FOR EVERY CAR—RUNNING POWERS TO A COMPANY—NOTABLE PROMENADE TRAMWAY SCHEME.

The Tramways Committee have given an order to the Equipment and Engineering Company, Limited, for a large number of jacks, with the intention of providing a jack for every car. When the lease of the tramway between the Grand Hotel and Squire's Gate to the Blackpool, St. Anne's and Lytham Tramways Company expires in July next, the Tramways Committee propose to take over the section. The company have made an offer for running powers on this line, and also from the Central Station to the Grand Hotel. A sub-committee of the Corporation have recommended that a Bill be promoted at an early date for the construction of a new promenade, a mile and a quarter in length, linking up the South Shore parade with the St. Anne's boundary. The plans include the provision of a 40-ft. carriage drive, a 20-ft. tramway track, an island footpath 10 ft. wide, a grass plot 25 ft. wide, and a 40-ft. wide promenade on the seaward side, with a 10-ft. footpath on the easterly side.

BRADFORD.

INCREASED CHARGES FOR PARCELS—POWER TO CURTAIL SERVICES.

Bradford Tramways Committee have increased the charges for ordinary parcels, and for all contract parcels (other than those carried for Corporation departments) by 25 per cent. Subject to the consent of the Corporation, the Tramways Committee have empowered the general manager to curtail the services as he may think fit, owing to the restricted lighting and the shortage of labour in the department.

DONCASTER.

NEW BY-LAW REGARDING PAYMENT OF FARES.

Doncaster Corporation have adopted the following by-law suggested by the Tramways Committee in place of the existing by-law No. 9, namely:—"Each passenger shall, either on demand or before leaving the car (whichever first happens), pay to the conductor or other duly authorised officer of the Corporation, the fare for his journey, and shall obtain a ticket therefor. Any person leaving a car shall be deemed to have completed his journey." Application has been made to the Board of Trade to approve the same and repeal the existing by-law.

GLASGOW.

MOTORISTS AND TRAMWAY PASSENGERS.

A fine of £10, with the alternative of 21 days' imprisonment, was imposed at Glasgow Sheriff Court on a motor-car driver, 17 years of age, who was charged with running down a young woman with a motor car on Sunday, May 21, in Church Street, Shettleston. The complainer had alighted from a car and proceeded round the back of it to cross the street. The motor car ran her down and she sustained severe injuries. The Sheriff said it was a very serious case, as the youth deliberately broke the by-laws by driving among passengers alighting from a car.

HULL.

NO APPLICATIONS FOR EXEMPTIONS OF EMPLOYEES.

Following the arrest of two motormen on a charge of being absentees from military service, the tramway employees appointed a deputation to the Tramways Committee with the object of ascertaining the position of the men of military age. The committee passed a resolution to the effect that they could not recommend any alteration in the policy hitherto proposed, namely, that no appeals be made in respect of any employee. The Bench have since handed the two men over to an escort, but did not impose a fine.

LEEDS.

DEVELOPMENT OF MINERAL TRAFFIC—REWARD TO A MOTORMAN—TRAINING OF MOTORMEN.

The transport of fireclay and coal from the Leeds Fireclay Company's mines at Harehills to the works at Wortley and Elland Road—a distance of five miles—has proved so satisfactory during the past twelve months that a proposal has been made for the conveyance of material from the Cardigan pit of the same company. A sub-committee of the Tramways Committee has been authorised to arrange with the company for the construction of a light railway from Cardigan pit to Wortley. On the recommendation of the general manager, Leeds Tramways Committee have awarded the sum of £5 to motorman S. Clayton for holding up with his car another car that had run backwards on Beeston Hill. On account of the shortage of men the tramways department have modified the rule that no man can become a driver unless he has served as a conductor. The course of instruction has, however, been made more thorough in order to atone for the shortened period of tuition. Both before and since the war motormen have been examined once a year in order to see if they retain all the knowledge imparted. These tests include the steps to be taken in various emergencies, such as a car running backward on a gradient owing to a sudden failure of electrical energy.

LIVERPOOL.

SUGGESTED INCREASE OF FARES—TOP DECK FARES—SOLDIERS' PASSES.

Sir Charles Petrie, a former chairman of the Tramways Committee, in reviewing the work of the Finance Committee during the municipal year, said he feared that the war grants and bonuses would more than absorb any saving effected in response to the request of the Government. He urged the several committees to continue to curtail or defer expenditure. To the Tramways Committee he suggested the advisability of re-arranging the penny stages. Many overlapping stages might be done away with. When everything had gone up in price people could not expect three-mile journeys for a penny. If in this way the committee could contribute £50,000 to the Corporation it would be acceptable. In acknowledging a vote of thanks accorded to him during the past year, Councillor Russell Taylor, chairman of the Tramways Committee, asked the public to continue to endure the inconveniences imposed by the war. He also requested passengers to assist the women conductors by paying fares before going to the top deck. Denying at the October meeting of the Corporation an assertion that wounded soldiers were not allowed free travel in the first-class cars, Councillor Taylor said that if they were allowed to travel without a ticket the system of checking would be upset. Up to the end of September 8,546,000 passes had been issued to wounded and unwounded soldiers and sailors, 240,000 to officers, and 153,000 to nurses. The carrying of soldiers, even at the penny fare, represented about £40,000. The time was approaching, owing to the restricted service, when they would have to reduce the number of passes during the crush hours. In the previous week they granted 75,000 passes. In only two towns did the naval or military uniform now entitle the wearer to a free ride. A vigilant outlook had to be kept for cases of fraud.

LONDON.

THE LONDON UNITED TRACKS—TAKING UP RAILS TO USE ELSEWHERE—THE MUNITIONS ACT—THE WAR AND L.C.C. DEVELOPMENTS—LINKING-UP OF POWER STATIONS—HALFPENNY FARES.

As the result of an interview with the managing director of the London United Tramways Company, the Ealing Council have decided that the Company should not be pressed in regard to reconstruction of track immediately upon the termination of the war. Meanwhile the company are to improve the condition of the track in Ealing. One or two councils do not seem to realise how the war has curtailed the supply of materials and labour. Brentford, for instance, have repeated their complaints to the Board of Trade regarding the alleged danger of the track. A member of this Council suggested that the omnibus company should be asked to extend their services, forgetting the shortage of petrol and that there are no vehicles available. The Traffic Group would also be justified in objecting to run the vehicles on roads that have deteriorated from the same causes that beset tramway authorities with difficulties all over the kingdom. To a complaint of the noise caused by cars turning a corner at Surbiton, the company replied that attention was being given to watering the rails, whereupon the local Council sent a reply that the noise was due to worn-out rails, and asked for repairs and renewals at the earliest possible date. Local authorities should be better able to appreciate the position when they learn that in consequence of the high price of rails the company are taking up the rails of the at present unused line in Lower Boston Road, Hanwell. The District Council have agreed not to consider this action as an abandonment of the line. The Ministry of Munitions

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having certified that the London County Council tramway facilities are of importance for the carrying on of munition work, the undertaking has become subject to Part I. of the Munitions of War Act. In the course of his annual review of the year, the chairman of the County Council said the energies of the Highways Committee and the tramway staff had been devoted to the task of providing sufficient and efficient means of transit for the thousands of munition workers. Owing to the war much work for development and linking-up would have to wait still longer for its accomplishment. Poplar Electricity Committee are negotiating with the County Council in order to link up the borough council's generating station with the power-station of the tramways. Poplar's electrical engineer states that this plan would be advantageous to both undertakings, as their peak loads occur at different hours. A conference of Metropolitan Councils has been arranged for consideration of the question of linking-up in the Greater London area. On account of the improved financial result of their tramways for the past year, Ilford Council decided not to abolish halfpenny fares. After considering a report by their manager on the attitude of the London County Council on the question, East Ham Council have deferred consideration of a similar proposal. This action may weaken the scheme for halfpenny fare abolition and the institution of a universal penny fare in each of the East London tramway areas.

NEWCASTLE-ON-TYNE.

ASSESSMENT OF THE TRAMWAYS.

The Tramways Committee have withdrawn their appeal against the assessment of the tramways, the Assessment Committee having agreed upon the figure of £40,666, instead of £50,000. The former amount is that for which the Tramways Committee had contended.

OLDHAM.

ROUTE NUMBERS—CARS SOLD TO ROTHERHAM.

Complaints having been made that it is impossible to tell from the indicators the destination of the Oldham cars, the number system is being adopted. Mr. Percy Priestly, the manager, had prepared a number of boxes in anticipation of the change being agreed upon. Rotherham Council have asked the Board of Trade to sanction the purchase of 12 tramcars from Oldham.

PLYMOUTH.

THROUGH RUNNING AND UNIVERSAL PENNY FARE.

The inauguration of the linking-up of the late Devonport Tramways Company's lines with those of Plymouth Corporation and the universal penny fare on all sections took place on October 23. Before that event the Mayor and Corporation made a tour of the tramways, after which Alderman W. Blackall, deputy mayor, expressed satisfaction at the inauguration of the dual innovation, which would, he said, be of especial benefit to the dockyard men, who lived at one end of the town and worked at the other end. The Mayor (Alderman T. Baker) said it was not yet possible to link up with the company which served Stonehouse and Devonport, but the lease expired in 1922, and he hoped an arrangement would be made long before then. Councillor J. P. Goldsmith, the mayor-designate, observed that the facilities would lead to the solution of the housing congestion by opening up four outlying districts. An indication of the outlook was given by Alderman S. H. Phillips, chairman of the Tramways Committee. Hitherto in both areas from 80 to 90 per cent. of the fares were for a penny, and the chairman looks to the increased traffic to make good the balance. Since taking over the Devonport tramways some of the fares have been reduced and the distances extended. For the year ended December 31, 1914, the company carried 6,694,154 passengers, and the receipts were £33,039. The Corporation figures on the same section for the year ended October 1, 1916, were 8,932,288 passengers and £39,430 receipts. For the nine months to October 1, 1916, the receipts were £30,500, as against £28,850 earned by the company for the nine months, to October 1, 1915. By May or June next the department hope to obtain delivery of eight new cars.

PORTSMOUTH.

VOLUNTEER MOTORMEN'S SUCCESSFUL WORK—GOOD SERVICE AND CONDUCT BONUSES.

In his fourteenth annual report, Mr. W. R. Spaven, general manager of the Corporation tramways, thanks the gentlemen who came forward to be trained as motormen, thus enabling the afternoon and evening services to be restored in March, 1916, to their original frequency. Mr. Spaven reports that the Tramways Committee decided on July 20, 1915, in consideration of the difficult conditions under which the ordinary staff are working, to increase the bonus paid to motormen and conductors whose conduct has been satisfactory and free from blameable accidents from 10s. a man each half year to 30s. a quarter; the women conductors to receive a bonus of 10s. each half year for general good conduct and freedom from reports. The number who have received the bonus is very satisfactory.

SALFORD.

MANCHESTER-BURY THROUGH RUNNING—LOST PROPERTY REGULATIONS.

In reply to Whitefield Council, the Salford Tramways Committee have stated that they cannot consider the question of a through service between Manchester and Bury until the conclusion of the war. Whitefield Council have replied: "That as the matter is one capable of arrangement with the Bury Tramways Committee, the Salford Corporation be informed that this Council do not consider that such through service would necessitate any increase in the number of drivers." Salford Tramways Committee have adopted regulations for dealing with lost property. All property that is not immediately claimed will be handed to the police, who will return it to the owners on payment of reward to the finder at the following rates:—Value under 5s., 6d.; 5s. and under 10s., 9d.; 10s. and under 20s., 1s.; 20s. and not exceeding £5, 2s. 6d. in the £; £5 and not exceeding £10, 3s. in the £; over £10, by special arrangement. If the property is unclaimed and afterwards sold, the finder will receive a percentage according to scale.

SHEFFIELD.

NEW CARS TO BE TENDERED FOR—JOINT WELDING FOR WORN-OUT RAILS—MATERIAL FOR UNIFORMS—PASSENGER SHELTERS—EMPLOYMENT OF DISABLED MEN.

Sheffield Tramways Committee are seeking the sanction of the Treasury to expend £35,000 for the purchase of 25 new tramcars, for which it is proposed to invite tenders at an early date. Mr. W. J. Hadfield, the city engineer and permanent way engineer to the tramways department, in his annual report, states that the number of welded joints on March 25 was 6,876, of which 3,762 were electrically welded. "This work," the report states, "has been a great help in dealing with old tracks that could not be renewed. Usually the joints wear out first, and the welding process has provided a practical method of lengthening the life of the track, which otherwise must have been relaid." The material used by a local firm which supplies the uniforms of the Sheffield women car conductors is khaki serge dyed navy blue indigo. The contractor states that there is nothing stronger, which accounts for the uniforms keeping their shape, although a good deal depends upon the way the wearer treats her clothes. The Tramways Committee have asked the city architect and the general manager to prepare plans and estimates for passenger shelters at Firth Park and Lodge Moor termini. A conference of chairmen of committees of Sheffield Corporation and their officials has drawn certain recommendations as to the terms on which to re-engage employees disabled in the war. Before adopting the draft it was decided to consult representatives of the Municipal Officers' Guild, Union of Tramway Workers, etc.

SOUTHEND.

LIGHTING RESTRICTIONS AND CORRUGATION REMOVAL—CAR MAINTENANCE DIFFICULTIES.

In order to cope with the development of corrugation, the tramways engineer has been authorised to make arrangements for the use of a machine during the slack period of the day, as the lighting restrictions prevent it being operated at night. Mr. R. Birkett, tramways manager and electrical engineer, has reported upon the difficulties experienced in maintaining the cars owing to the restrictions placed on manufacturers engaged on war work. In the event of alterations that have been made to the trucks of certain cars not proving satisfactory, prices will be obtained for three new trucks, to be delivered next spring.

SWANSEA.

NEW LEASES FOR THE TRAMWAYS COMPANY—MUNICIPAL SUPPLY OF ELECTRIC ENERGY.

Swansea Corporation have adopted a report presented by the Tramways Committee advising the granting of new leases to the Improvements and Tramways Company of (a) the tramways included in the tramway lease dated October 23, 1906; (b) the light railways and electrical equipment included in the light railway lease of October 23, 1906; and (c) the tramways recently constructed under the Swansea Corporation Act, 1912. The existing tramway and light railway leases are to be surrendered. On and after November 4 the Corporation are supplying the Tramways Company with electric energy for all their lines. Some months ago the company disposed of their generating station to the municipality, and considerable extensions of plant have been installed by the Town Council.

FOR HIGH-CLASS
CONDENSING PLANT
WRITE TO
THE MIRRLEES WATSON CO., LTD.,
SCOTLAND STREET, GLASGOW.

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PATENT LIST.

Abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

*** If the inventions have been communicated the names of the communicators are given below in italics.

APPLICATIONS FOR LETTERS PATENT.

Fuel supply for motor vehicles (13,864)—T. A. Barton.
Tie-rod and steering arms for motor vehicles (13,570)—G. C. Hayes and C. C. D. Steele.
Solid rubber tires (13,807)—W. and A. Bates and J. Healey.
Driving mechanism for motor vehicles (13,595)—C. H. Blomstrom.
Electric train lighting systems (13,942)—H. Leitner.
Transmission gear for motor vehicles (13,804)—C. F. Oliver.
Trolley pole attachment for preventing flash at breaking points (13,768)—G. T. Theobald.
Mechanically propelled vehicles (13,552)—W. W. Woolidge.
Lubricating wheels and axles of railway vehicles (14,145)—J. Abbott.
Rail fasteners (14,152)—G. C. Amundson.
Train controlling apparatus (14,108)—A. F. Bound and W. Rowland.
Band brake for steam motor vehicles (14,053)—R. Bradbury and F. C. Saunders.
Motor vehicles (14,196)—W. E. & C. H. Crawley, and M. E. Starkey.
Repairing electric power transmission lines (14,068)—J. E. Husebye.
Heavy fuel carburetters for internal combustion engines (14,173)—London General Omnibus Company and C. J. Murfitt.
Life-guards attached to fore part of power-driven vehicles (14,043)—E. W. Mannion.
Closed bodies for motor vehicles (14,015)—L. W. Pratt.
Window fittings for motor vehicles (14,016)—L. W. Pratt.
Electrically propelled vehicles (14,169)—F. W. A. Radford.
Rail joints (14,431)—A. A. Goss.
Motor vehicles (14,448)—M. Goudard and M. Mennesson.
Rail dressing machines (14,581)—W. E. Hanshue.
Clutch and gearing for motor cars (14,493)—L. T. Jones.
Route indicator for tramcars (14,425)—W. H. Lancaster.
Inflating pneumatic tires of power-driven road vehicles (14,639)—G. Lister.
Motor-driven vehicles (14,398)—A. E. Munby, J. Williamson, and the Portland Engineering and Traction Company.
Means for obscuring the lights of railway signals, trains, and vehicles (14,434)—H. Rawson.
Reinforced concrete railway sleeper (14,610)—F. L. Rings.
Frames of motor road vehicles (14,630)—F. Sumner-Smith and R. P. Yates.
Motor road vehicles (14,502)—O. Tilley and B. L. Wilson.
Automobile vehicles and tractors (14,885)—H. J. Balcombe and the Daimler Company.
Safety signalling device for motor cars (14,657)—W. W. Castelow.
Built-up metal wheels for motor vehicles (14,969)—W. Challiner.
Train-stopping apparatus (14,835)—J. L. Duggan and J. D. Maynard.
Mudguards for vehicle wheels (14,869)—C. Guise and T. J. Southall.
Stopping-place indicator for tramcars (14,677)—E. Roscoe.
Permanent way chair (14,905)—E. Webb.
Live back axles for motor vehicles (15,224)—Albion Motor Car Company and T. B. Murray.
Speed indicating devices for motor vehicles (15,199)—A. A. Benson and Benson, Flick and Solberg.
Automatic train-stops (15,190)—C. H. Buhl.
Railway sleepers and means for fixing rails thereon (15,143)—L. Pelnard-Considère.
Brake operating levers of motor cars, etc. (15,056)—G. R. Dundas.
Means for propelling road vehicles (15,118)—R. W. Hutton.
Driving gear for motor road vehicles (15,404)—G. F. Joseph, Portholme Aerodrome, Limited, and W. G. Wilson.
Steering gear for motor road vehicles (15,403)—G. F. Joseph, Portholme Aerodrome, Limited, and W. G. Wilson.
Shoe or skate for electric railways (15,334)—H. L. Lambert.
Power-driven road vehicles (15,411)—G. Lister.
Live back axles and gearing for motor vehicles (15,300)—R. R. Mellor and T. M. G. Morton.
Motor road vehicles (15,275)—H. Menche de Loisne.
Locking devices for automobiles (15,142)—I. D. Perry.
Trolley heads for electric tramcars (15,365)—C. Svombo.

SPECIFICATIONS PUBLISHED.

1915.

Electric lighting of vehicles (12,781)—Smith and Robinson.
Anti-slip devices for the wheels of motor vehicles (13,154)—Wilson.
Road vehicles (13,520)—Stell and Stell.
Transmission of power, especially applicable to vehicles (12,949)—Thomas.
Method of securing traction of driving wheels of vehicles (13,289)—Macfarlane, Anderson and Robinson.
Safety railway facing points (14,197)—Woodward.
Brakes for motor vehicles (14,483)—Roe and the R.E.T. construction Company, Limited.
Ventilators for railway carriages (13,860)—Mead, McLean and Company and Mead.

1916.

In the following list the numbers in italics are those that the specifications will finally bear and under which they will be indexed and abridged before acceptance and finally printed. The application numbers should, however, still be used for correspondence purposes.

Automobile tires (5,102—*101,317*)—J. C. Anderson.
Means for slidably connecting multi-concentric driving members, with special reference to gear boxes for motor vehicles (8,144—*101,460*)—W. Skaife.
Roller bearings for the axles of railway vehicles (10,255—*101,468*)—J. Heppell and R. G. Dobson.
Railway rail anti-creepers (10,617—*101,469*)—B. B. Betts.
Means for joining railway rails with fish plates and chairs (1,528—*101,494*)—F. W. Ruffell.

Colonial and Foreign Tramways Traffic Returns.

NAME OF COMPANY.	1915. WEEKS ENDED.				1916. WEEKS ENDED.						AGGREGATE.		
	Oct. 2	Oct. 9	Oct. 16	Oct. 23	Oct. 30	Sept. 30	Oct. 7	Oct. 14	Oct. 21	Oct. 28	Wks.	1916.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Anglo-Argentine	49 939	53,082	53,405	50,754	...	50,947	54,067	53,349	...	...	43	2,138,409	+ 343
Calcutta ... ... Rs.	63,824	71,039	69,492	66,319	...	74,297	76,405	64,042	65,596	...	43	2,858 015	+129,811
Madras ... ... Rs.	28,304	(2 weeks)	29,529	(2 weeks)	...	31,788	(2 weeks)	32,305	(2 weeks)	...	41	602,091	+ 44,501
Pernambuco ... ... $	2.945	3,035	3,070	3,078	...	3,094	3,369	3,216	3,216	...	42½	127,369	— 2,016

Companies Issuing Monthly Statements.

	1915.						1916.						Wks.	AGGREGATE.	
	May.	June	July.	Aug.	Sept.	Oct.	May.	June.	July.	Aug.	Sept.	Oct.		1916.	+ or —.
	£	£	£	£	£	£	£	£	£	£	£	£		£	£
Ballarat & Bendigo ...	2.885	2,692	2,677	2,860	...	...	3,855	2,793	2,704	2,791	...	...	20	15.870	+ 836
Brazilian Traction Mlrs	6670110	6591940	6703000	6576000	6494000	...	7091000	6961000	7195000	7184000	6920000	...	39	61,249,000	+ 3,791,890
Brisbane	31,780	29,880	31,150	35,064	30,360	...	33,510	31,390	32,880	37,900	32,530	...	39	297,660	+ 22,586
British Columbia $	512,568	498,093	510,723	507,126	517,022	..	542,353	529,078	538,293	550,293	540,440	...	13	1,629,026	+ 94,155
Buenos Aires Pt. & C.	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Buenos Ayres Lacroze	44,480	40,421	41,460	41,468	39,355	43,516	41,503	36,213	38,439	36.431	37,075	39,670	17	151,615	— 13,184
Burma	...	...	...	25,159	22,163	...	...	...	...	24,412	23,749	...	9	48.161	— 839
Cape Town	...	...	...	...	...	...	...	12 920	13,357	13,394	...	...	—	—	—
Carthagena & Herrerias	1,931	2.059	2.157	1,523	1,252	2.169	2.927	3,512	2.371	2.081	1,779	2.539	44	25,139	+ 7,390
Cordoba	14 494	14 059	14,375	14.159	13.210	...	14.868	14 129	14.263	13.852	13.389	...	26	84,554	+ 648
East India	2,119	2 194	2.231	2 266	2,054	2.069	2.161	2.283	2.220	2.522	2,523	2.080	13	7,125	+ 736
Kalgoorlie	3.269	2,707	2 775	3.165	...	...	2,921	2.500	2.521	3.021	...	...	35	20.479	— 1,640
La Plata	4,489	3.875	4.054	4.164	3.894	...	4.343	3,735	3.909	3,792	3.994	...	39	37.622	— 257
Lima	...	...	...	32,004	30,530	...	...	...	...	33,395	33,348	...	39	304.058	+ 15,777
Manaos ... Rs.	...	...	...	...	...	...	152,854	144,913	152.380	...	...	...	—	—	—
Manila	...	...	23,750	...	...	...	...	...	33,700	...	...	...	31	887,739	+ 39 986
Melbourne	...	...	...	...	...	...	69,275	...	...	...	...	...	—	—	—
Mexico ... $	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Monte Video	27.771	24 266	25.161	26.494	25.070	...	28.349	25.300	25.220	26.044	26,711	...	48	319.043	+ 15,626
Peruvian	737,166	759,374	724,838	819,039	755,280	...	826,900	929,500	835.430	895,900	911,910	...	13	2,643,240	+ 344,083
Port Elizabeth ...	...	...	...	...	...	...	2.809	3,166	2.863	...	...	...	—	—	—
Rangoon	4 887	4.997	4 629	4.510	4,445	4.886	4.589	4.205	4.357	4,253	4.137	5.043	44	46 371	— 1,844
Toronto ... $	795.262	787.558	773.013	762.627	804,902	...	903,924	884.491	867.789	889.241	913,535	...	39	8 005.764	+ 855,159
Winnipeg $	263.302	255.549	248.022	251.189	261.982	..	276.980	254.686	242.688	249.795	267.497	..	39	2,461,454	— 51.995

(Continued on page 364)

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TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1915. WEEKS ENDED.					1916. WEEKS ENDED.					AGGREGATE.		
	Oct. 2	Oct. 9	Oct. 16	Oct. 23	Oct. 30	Sept. 30	Oct. 7	Oct. 14	Oct. 21	Oct. 28	Wks.	1916.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Aberdare U.D. Council	356	377	373	339		431	443	394	407		30	11.876	- 1.360
Aberdeen Corporation	1.767	1.729	1.673	1 674		2.025	1.912	1.880	1.768		20	39.517	- 2.201
Accrington Corporation	584	484	540	545		670	554	524	571		29	17 173	- 675
Ayr Corporation	363	284	276	254		438	331	300	283		23	11.626	- 989
Bath Electric	*												
Birkenhead Corporation	1.366	1.355	1.408	1.282		1.671	1.596	1.598	1.585		29½	45.760	- 4.529
Birmingham Corporation	15.213	15.403	15.348	15.185		18.118	17.079	14.725	14.766		29	480.859	- 66.610
Birmingham Corp. Motor Omnibuses	829	880	891	786		1.078	961	1.058	991		29	29.348	- 3.732
Blackburn Corporation	1.245	1 135	1.188	1.173		1.385	1.221	1.123	1.157		29½	38 607	1.124
Blackpool and Fleetwood	800	665	496	393		2.462	845	565	442		42	40.768	- 4.830
Blackpool Corporation	*												
Bolton Corporation	2.545	2.693	2.698	2.580		3.539	2.911	2.853	2 892		30	87.146	- 6.110
Bournemouth Corporation	1.981	1.995	1.977	1.723		2.337	2.223	2.118	2 032		30	73.244	- 5.231
Bradford Corporation	6 393	6 267	6.616	6.149		7.077	6.492	6.928	6.587		29	204.579	- 7.275
Brighton Corporation	1 101	1.099	1.067	956		1 421	1.228	1.231	1.154		29½	40.014	- 4.085
Bristol	9.702	9 096	9.282	9.483		10 997	10.570	10.421	10 358		42	425.467	- 21.807
Burnley Corporation	1,592	1.564	1.615	1.553		1 766	1.797	1 678	1,707		30	52 135	- 2 949
Burton-on-Trent Corporation	286	316	274	263		294	321	310	279		29	8.219	529
Bury Corporation	1.329	1.332	1.313	1.256		1 726	1 408	1.410	1.372		30½	43.738	- 2.102
Cardiff Corporation	2.717	2 667	2 653	2.540		3.151	3.157	3.057	2.993		29	89 500	- 8.031
Chatham and District	1.241	1.221	1.220	1.147		1.381	1 353	1 343	1.316		42	52.197	- 2 488
Chesterfield Corporation	268	266	275	266		285	301	281	281		29	8.351	319
Colne Corporation	246	253	258	253		278	316	259	262				
Cork Electric	503	542	522	500		542	540	567	544		42	21.635	- 282
Croydon Corporation	*												
Derby Corporation	1.014	1 017	1 052	992		1.163	1.190	1.180	1.148		29½	34 028	- 2.398
Dover Corporation	*												
Dublin and Lucan	165	150	149	136		189	165	148	143		16	2.920	- 223
Dublin United	6.264	6.077	6.241	6.062		6 682	7 058	6.549	6.341		42	256.127	1.216
Dundee City	1.351	1.149	1.395	1.345		1.393	1 438	1.394	1.347		22½	31.813	- 752
East Ham Corporation	1.299	1 232	1.298	1.277		1.392	1 302	1.317	1.288		29½	39.146	- 196
Exeter Corporation	367	363	370	347		445	431	427	394		29	12.147	- 457
Gearless Motor 'Buses	*												
Glasgow Corporation	23.054	22.359	22.551	21.965		24.543	24.296	23.899	24.246		20½	481.573	34 098
Glasgow Subway	1.096	1.107	1.064	1.096		1.123	1.165	1.169	1.224		42	47.958	- 4.224
Glossop (Urban Elec. Supply Co.)	128	136	133	128		162	146	146	140		43	5.995	- 568
Halifax Corporation	2.287	2.106	2.094	2.132		2.341	2.223	2.044	2.098		28½	67 308	- 926
Halifax Corp. Motor Omnibuses	50	48	49	47		52	52	49	51		28½	1.458	- 52
Hastings and District	1.032	984	956	874		1.267	1.076	960	936		42	45.286	- 2.873
Huddersfield Corporation	2.822	2.557	2.526	2.512		3.117	2.791	2.789	2.775		29	85 006	- 7.454
Hull Corporation	3.067	3.064	3.078	3 042		2.979	3.025	3.269	3.139		29	91.645	- 1.468
Ilford U.D. Council	627	620	608	603		689	669	677	642		29	20 539	- 1.085
Ilkeston Corporation	*												
Ipswich Corporation	542	523	518	506		557	474	471	435		29	16.045	849
Isle of Thanet	372	340	330	287		436	338	336	292		3	966	106
Kilmarnock Corporation	163	164	162	166		181	180	174	176		22½	4.076	64
Lanarkshire	2.426	2.101	2.152	2.318		2.658	2.485	2.416	2.289		42	97.467	- 14 144
Lancashire United	1.788	1.705	1.734	1 718		2.170	2.349	1.873	1.850		42	77.398	- 3.815
Leeds City	8.998	8.821	8.817	8.666		10.310	9.902	9.909	9 692		30	292.481	- 26.259
Leicester Corporation	*												
Leith Corporation	786	765	776	741		909	886	867	858		22½	20.510	- 2.466
Leyton U.D. Council	1.606	1.561	1.584	1.512		1.889	1.651	1.557	1.537		29	49.962	- 988
Liverpool Corporation	13.492	13.544	13.665	13.248		15.080	14.619	14 943	14.477		42½	595.782	- 31.129
Llandudno and Colwyn Bay	352	302	276	250		461	327	316	284		46½	17.502	- 1.089
London County Council	46.950	45.729	45.423	45.962		51.640	50.215	49.436	48.920		28½	1.408.250	- 140 908
London General Omnibus	*												
London United	*												
Lowestoft Corporation	*												
Maidstone Corporation	266	253	226	215		248	260	221	216		29	6.625	- 172
Manchester Corporation	17.606	18.289	18.281	17.879		19,765	19,169	19.216	18,648		28	558.205	- 29.712
Metropolitan Electric Tramways	*												
National Steam Car	*												
Nelson Corporation	201	200	182	179		237	201	196	197		29½	6.395	- 494
Newcastle-on-Tyne Corporation	6.542	6.509	6.507	6.364		7.117	7.123	7.150	7.017		29	196.466	- 9.625
Newport (Mon.) Corporation	831	814	822	795		1.014	1.064	982	950		29	28 275	- 3.012
New St. Helens and District	1,037	961	982	953		1.111	1.170	1.075	1.041		16	19.258	- 1.199
Northampton Corporation	707	675	686	659		732	732	721	722		29	20.963	1 229
Nottingham Corporation	3.682	3 725	3.773	3.689		4.592	4.064	4.077	4.041		29	115.568	- 4.702
Oldham Corporation	2.169	2.373	2.352	2.240		2.498	2.303	2.468	2.382		30	76.493	- 4.463
Portsmouth Corporation	2,372	2.398	2.362	2 220		2.883	2.746	2.686	2.526				
Preston Corporation	962	962	954	956		1.156	1.163	1.177	1.184		28	32.329	- 3.903
Provincial	2.172	2.244	2.246	2.105		2.591	2.281	2.373	2 251		3	6.905	- 235
Reading Corporation	781	767	768	739		924	930	930	891		28½	25.550	- 1.847
Rhondda Tramways	1.252	1.241	1.271	1.256		1.424	1.418	1.383	1.363		42	54.162	- 4.836
Rochdale Corporation	1.619	1.714	1.710	1.643		1.885	1.809	1.784	1.715		29½	54.258	2 160
Rotherham Corporation	1.179	1.191	1.167	1.176		1.625	1 652	1.590	1.618		29½	46.549	- 11.721
Salford Corporation	5.104	5.302	5.279	5.048		5.800	5.488	5.413	5.421		29½	164.865	- 8.453
Sheffield Corporation	9.130	9.196	9.331	9.099		11.505	10.471	10.709	10.656		30½	318.973	- 49.704
Southampton Corporation	1.547	1.556	1.548	1.469		1.721	1.820	1.771	1.726		28½	49.302	- 4.374
Southend-on-Sea Corporation	809	723	699	670		954	929	833	786		29	30 233	- 3.478
South Metropolitan Tramways	*												
South Shields Corporation	791	821	775	764		971	961	854	829		29½	25.043	- 1.146
Sunderland Corporation	1.470	1.479	1.502	1.426		1 903	1 655	1.657	1.630		29	48.852	- 3 681
Sunderland District	595	564	1.034	585		698	656	726	726		50	31.724	- 2.178
Swindon Corporation	209	198	196	191		220	222	209	205		28½	6.056	- 156
Torquay Tramways	573	539	526	506		741	624	592	544		42	25.830	- 1.975
Tramways (M.E.T.) Omnibus Co.	*												
Tyneside Tramways and Tramroads	619	593	592	574		689	636	640	633		16	11.247	- 836
Wallasey Corporation	1.187	1.213	1 191	1.118		1.434	1.299	1.320	1.243		29½	42.309	- 2 510
Walsall Corporation	775	802	768	774		869	841	842	823		43	34.778	- 3.254
Walthamstow U.D. Council	823	820	805	771		1.323	1.071	1.058	1.021		29	33.543	- 5.456
Warrington Corporation	466	464	470	457		535	521	514	520		29	14 453	- 1.189
West Ham Corporation	3,081	3.034	3,086	2.964		3.666	3 395	3.287	3.271		28½	95.589	- 3.799
Wigan Corporation	1,548	1.553	1.597	1,586		1.776	1.758	1.719	1.734		29	49.217	+ 4.165
Wolverhampton Corporation	*												
Yorkshire (West Riding)	1,579	1 540	1.579	1.436		1.915	1.834	1.803	1.757		43	75.910	- 7.604

* TRAFFIC RETURNS SUSPENDED.

Owing to the European war, the Government have taken over the railways of Great Britain as from August 4, 1914, and the issue of traffic returns has been suspended. Consequently the traffic returns of the electric railways which usually appear on this page cannot be given.

The Publication of the Traffic Returns of the Tramways marked with an asterisk in the above table have also been suspended during the war.

TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officials and the principal particulars relating to each undertaking.

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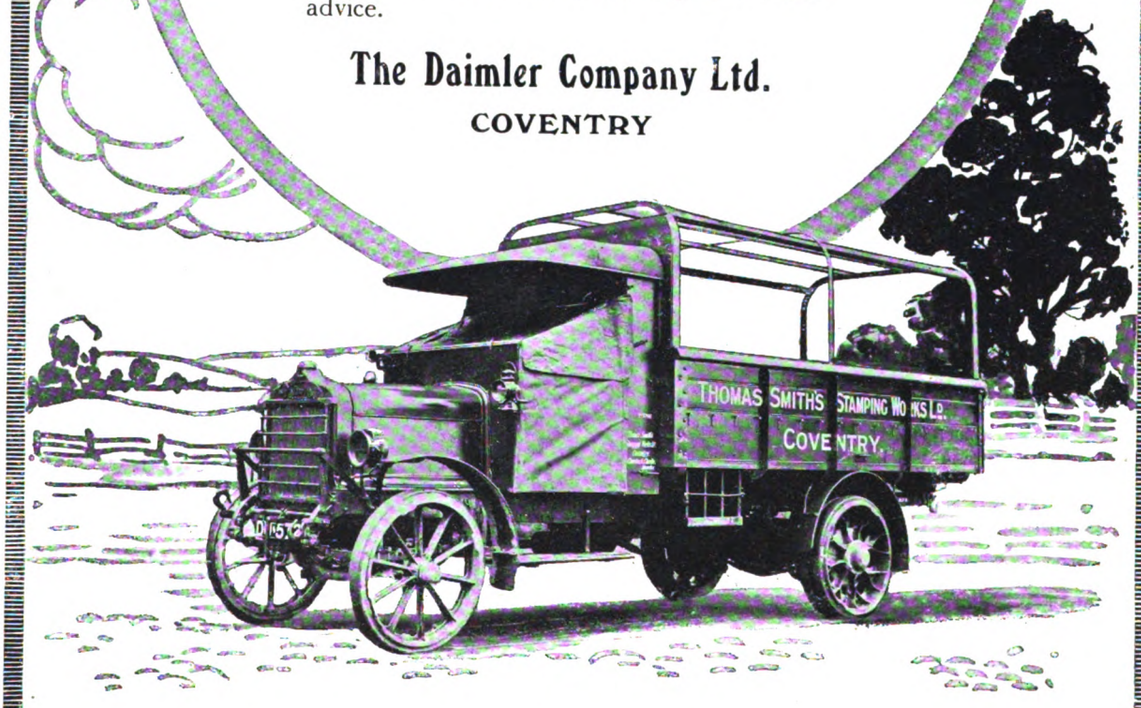

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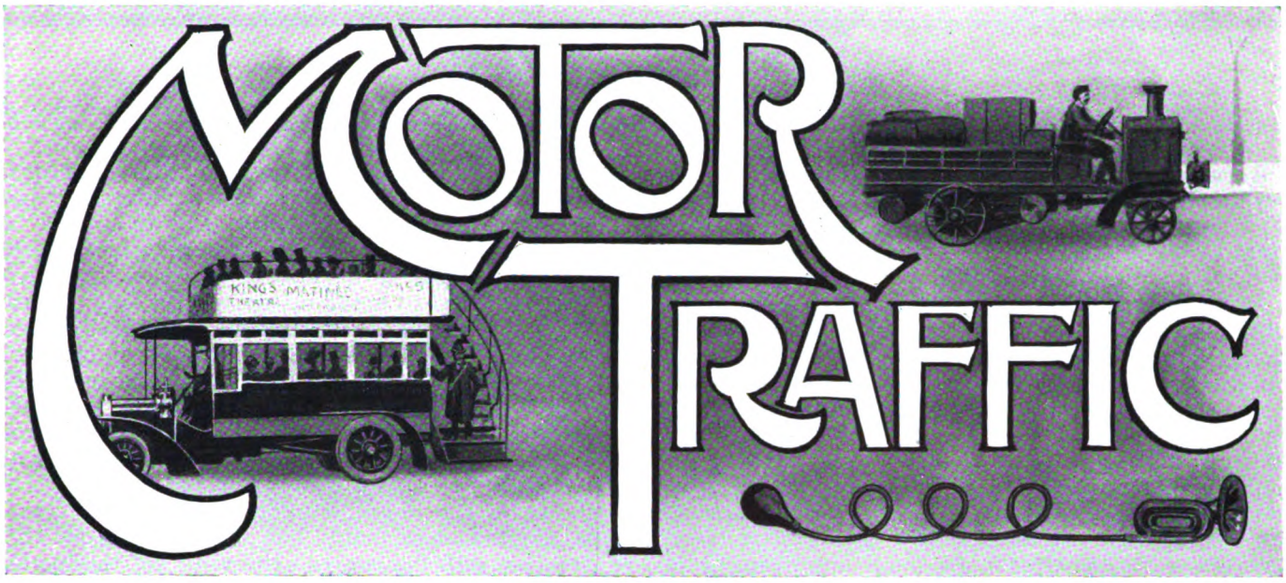

In the process of reconstruction that must inevitably follow after the war has reached an end there is every sign that questions of roads and transport will come in for a very large share of attention. In the first place, the effect upon the roads of the abnormal war traffic, plus the relative neglect in regard to repairs arising from shortage of labour and materials, and to some extent from wrong ideas of economy, will call for very extensive schemes of reinstatement all over the country. Secondly, the question will arise as to whether, in the interests of national development, it may not be necessary to study, from an entirely fresh aspect, such problems as those of rural transport. For instance, there is quite an appreciable body of opinion in favour of the establishment over here of light railways, running alongside the highways, similarly to the "vicinales" of Belgium. Thirdly, the military lessons of this war, whereby the strategic importance of roads has been increased a hundredfold, as compared with pre-motor campaigns, may in itself have no little influence in the future of our highways. We may, in fact, find it advisable to take the soldier into our counsels when laying down programmes of road construction in the times to come. For various reasons therefore the whole broad issue of roads and locomotion is, or will be, more or less in the melting-pot. It is to be hoped that the opportunity thus afforded to consider all the various factors afresh will be well and wisely used. There is no longer any excuse for prejudice in these matters—especially anti-motor prejudice. Our roads for the future must be essentially *motor roads*, designed and constructed to meet the needs of motor traffic, and with an eye to the possible use of a part of such roads for tramways or light railways. That being done, the problem of heavy upkeep expenditure alleged to be due to such motor traffic hitherto will automatically disappear, and there will not be even a colourable case for that additional taxation of motor vehicles which was being pretty extensively advocated just before the outbreak of the war. The expenditure thus incurred can only be regarded as part of the cost of national recuperation after the war, serving, as it will do, the purposes and interests of the whole nation, and not merely that of people concerned with the operation of motor traffic.

* * * * * *

Everything, indeed, must be done to make transit of all kinds cheaper than it has ever been; and as mechanical transport is destined in the future to play a more and more important part, the question of freeing it entirely from all taxation might well be considered. Economically, the motor spirit duties have always been unsound, because they tended to raise artificially the cost of what has become in present day conditions a prime necessity of life—that of transit. With the necessity of cheapness and efficiency in mind, and especially in view of the peculiar demands of rural transport, the claims of the light railway in connection with mechanical road vehicles will need the very closest and most careful examination. Against the former is the fact that the outstanding need in the transport of agricultural produce is that it shall go through without intermediate handling from its place of origin to destination. The railway, whether light or otherwise, usually fails to meet this need, and that is why farmers and market gardeners within a hundred miles of London are sending more and more of their goods by motor. It is urged that this heavy goods and industrial traffic is too much for the roads. No doubt it is, but, as already pointed out, we shall have in the future—let us hope it will prove to be a near future—an excellent opportunity of rebuilding our highways so that they may withstand more satisfactorily the traction of heavy motor vehicles. Even when this has been done it is not difficult to see that where traffic is heavy and continuous, motor vehicles may require to be supplemented by light railways; for it must not be forgotten that no method of traffic cheaper than a metal wheel on a metal rail has yet been discovered. As to how far the military factor is destined to enter into future road plans, it is perhaps somewhat early to speculate, and therefore little more can profitably be said on this aspect of the roads problem. But that this new factor cannot be entirely ignored in future, even in Great Britain, is quite certain, whilst on the Continent its importance may be very pronounced. To some extent, however, it would appear that military and civilian needs in regard to road facilities are much the same. Both require that highways should be well constructed, straight and wide; that they should be sufficiently numerous to distribute traffic over a wide area, and not cause it to converge over much and create congested centres. In other words, there is a military as well as a civilian traffic reason for bye-pass roads.

From roads to municipal motors is not a violent transition. For more reasons than one the development of motor transport for public services has received truly remarkable impetus since the end of 1914. In

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MOTOR TRAFFIC.

many cases, it is true, owing to the wholesale manner in which horses were commandeered at the commencement of hostilities, municipal officials—however conservative they had been before—found motors thrust upon them, so to speak. With others the acquisition of motor vehicles was in large degree a measure of self defence against the demands of contractors. In other cases, let it be said, the war gave officials the opportunity to carry out ideas which they had previously in mind but which the conservatism and the mistaken notions of economy of their councils had hindered them from carrying out. The general result has been that those places and departments that had stood out against mechanical transport were compelled to give way, and fleets already existing have been increased, with consequent all-round improvement in efficiency of services, and appreciable saving of money.

* * * * * *

Good as are the results that have been achieved, however, it is becoming increasingly clear to everyone concerned—engineers, officials, and motor manufacturers alike—that they do not represent the best possible. The average municipal vehicle spends too much of its time standing idle, this being due to the fact of its being adapted as a rule for one particular purpose only in which full employment cannot be found for it. Accordingly a demand is arising—and manufacturers are endeavouring to meet it—for a municipal lorry for general purposes. There is no reason why one and the same chassis should not serve, by means of interchangeable bodies, as a dust van, as a watering vehicle, and as an ordinary goods carrying lorry. The adoption of such a type would materially reduce the cost of municipal services in many places, while standardisation would keep the price of such vehicles down to the lowest possible minimum, affecting thus a double economy. As a practical proposal, standardisation should be easier to achieve in public service vehicles than with trade vans, because the essential purpose never varies, and the loads to be carried and the work to be done are generally speaking always the same. Nevertheless, borough and county engineers have in the past often needlessly added to the cost of the vehicles they acquired by insisting on totally superfluous modifications from the makers' own designs. With closer study of the municipal vehicle problem, and with greater experience in the use of motor transport, however, this tendency has become much less pronounced, and it is now generally realised that the ideal for municipal work is the general utility vehicle, built on a highly standardised model, and giving for this reason the utmost in the way of service for the smallest expenditure.

In consequence of drivers of other vehicles having driven through passengers leaving and entering tramcars a suggestion has been made that the Newcastle Corporation should obtain sanction to a by-law prohibiting the practice. Such a regulation exists and is enforced in the city of Glasgow. There was a likelihood of a demand for a similar regulation arising in London at the time when the competition between omnibuses and tramcars led the drivers of the former to blanket the cars at the stopping-places. Thanks to the present management that procedure has been dropped, and the regular stopping points are for the most part separated. Wherever it is possible the omnibuses draw up under a lamp, a procedure that fits in at night with the company's safety first campaign. If there is a considerable crowd waiting to enter a car the omnibus driver will sometimes stop his vehicle, particularly during darkness, but car passengers have now become used to lining up against the side of a car when an omnibus horn is sounded. While the legal consequences of an accident or a fatality under such circumstances might be serious, yet if the oncoming vehicles were always compelled to pull up much obstruction would be created in busy thoroughfares, for it is seldom that the traffic is sufficiently slack to enable drivers to pass a tramcar on the off side. The flexibility of the motor omnibus enables that course to be adopted occasionally, but at night it is one that is attended with danger, especially during this period of restricted lighting. Viewed from this aspect the risk attendant on attempts to pass on the off side has been increased by the fact of the military authorities having forced tramway undertakings to cease the use of the familiar light on the centre of the dashboard, substituting a small lamp higher up on each side. On consideration of every aspect of the case it must be admitted that omnibus drivers in London now show greater consideration for other users of the road; their task will be rendered easier as progress is made by the "General" Company in educating the public to adopt habits of safety. One of the company's recent advertisements in that connection renders a service to tramway as well as omnibus operators. It is in the series "Behind the Scenes on the L.G.O.C.," and gives an explanation of how the vehicles are run to time. Passengers are reminded that they can assist in securing that result, and also help to ensure the convenience of the public by "boarding and alighting at recognised stopping-places whenever practicable; alighting when the omnibus halts near their destination, instead of stopping it again almost as soon as it has re-started; allowing alighting passengers to get off first; and the observance of other little matters of a like nature."

PROGRESS OF THE BATTERY VEHICLE.

According to statistics in the *Electric Vehicle*, published by the Electric Vehicle Committee, there were in August last in use, or on order, in this country 778 battery propelled vehicles, as compared with 150 in 1914. Among the largest users are the Midland Railway, 76; other railway companies, 30; Harrod's Stores, 64; Hertford Street Motor Company (London), 120; tramway authorities, 22; private cars, 57; municipal authorities, 30; electricity undertakings, 42; munition works, 23. A two-column article deals with a report prepared by Mr. Pearce, Manchester City electrical engineer, of an eight weeks' trial of a 1-ton Edison lorry. Mr. Pearce was sceptical as to the possibility of the electric lorry being able to compete with the existing contract carting arrangements based on a payment of 1s. 6d. per van per hour, and also as to the claims made for the former. The report shows that the cost of running of the lorry comes to about 2s. 1¼d. per hour, including depreciation, interest, insurance, and the usual working expenses. Energy consumed worked out at approximately one unit per mile, the cost being ¼d. per unit. The electric vehicle is shown to be worth 2½ horse vans. The horse van costs 9d. per mile traversed, with no known allowance for depreciation or renewal, while the lorry cost only 7·65d. per hour, running 188·1 miles a week average and showing a weekly ton-mile total of 81·95. This running cost per mile allowed for complete renewals of the battery at the end of ten years. Mr. J. R. Mead, Ipswich borough surveyor, contributes an article on a year's experience of an electric 3-ton tipping wagon supplied by the General Vehicle Company. Mr. Mead's only criticism is of the slowness of the hand-tipping gear, and he suggests that power-operated gear should be fitted.

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STRAKER MACHINES FOR THE RUSSIAN GOVERNMENT.

The group of Straker-Squire 40-H.P. lorries, shown in the accompanying illustration, is part of a large order from the Russian Government, the delivery of which has now been completed. The chassis of these machines is the Straker-Squire standard "CO_4" type and is constructed to carry a nett load of 4 tons, excluding the weight of the body. The principal dimensions of the chassis are as follow :—

Overall length	20 ft.	1 in.
Overall width ... ... (4 tons)	7 ft.	1⅜ in.
Wheel base	13 ft.	6 in.
Wheel gauge to centre of tires (4 tons)	5 ft.	9¼ in.
Length from dash to rear of frame ...	15 ft.	3⅞ in.
Length from dash to centre of back axle	11 ft.	2⅜ in.

The engine is of the four-cylinder type, 4½-in. bore by 5-in. stroke, cast in pairs. All the valves are interchangeable and are located on one side of the cylinders, being operated by one camshaft. An automatic system of lubrication is maintained by means of an oil pump driven by spiral gearing from the camshaft. All water passages and pipes are of large dimensions, as the cooling is on the thermo-syphon system. High-tension magneto ignition is fitted, the drive of the camshaft and magneto being by helical wheels, thus insuring silent running.

The gear box provides for four speeds forward and a reverse by sliding gears, the ratio between the top and bottom speeds being 4 to 1. The direct drive is on the top speed. The transmission from the gear box to back axle is by cardan shaft and worm and wheel gearing, the drive being then transmitted through two shafts direct to the wheels, which rotate upon the stationary axle forging at the ends of the tubular arms. No portion of the vehicle or its load is therefore taken by the driving shafts. The wheels are of cast steel, and are fitted with "Wood-Milne" tires 1,010 × 120 mm. twin on the back, and 900 × 120 mm. on the front.

A Group of Straker-Squire 4-Ton Lorries Ready for Delivery to the Russian Government.

LIMITED NUMBER OF SOLID TIRE FITTERS.—An appeal was made on October 13 to the Law Society Tribunal, London, by a company supplying commercial motor tires, for the exemption of a solid tire fitter. A representative of the firm stated that he did not suppose there were more than 25 solid tire fitters in England, and the man was given two months before going to the army.

FRENCH ARMY TRANSPORT.

In several special articles contributed to the *Westminster Gazette* in October by its Editor, as the result of a recent visit to the French Army, from the Meuse to the Somme, interesting details are given of the railway and road motor organisation of our ally. Mr. Spender states that "scores of miles of new railway may be built for one operation, and the rapidity with which this work is carried out is one of the marvels of the war. Lines which would take a year or two years to build in time of peace are built in a month or two months. A whole new railway 80 kilometres in length, and double-tracked, was laid at Verdun in ten weeks.

"The railhead is seven or eight miles from the trenches, or even farther, if the army has advanced several miles since it was established. From this point the motor lorry takes up the work and carries on the supply to divisional, brigade, and regimental headquarters, from which again there is a final journey by forage cart, by mule, pony, donkey, and the human back up to the communication trenches. Immense convoys of motor lorries await the trains, and from that point forward there is a continuous traffic, thickening and multiplying as you approach the front. The lorry is boss of the road. With its broad beam and domed roof, it dominates the landscape; you see it by the dozen, by the score, by the hundred, by the thousand, keeping its distance, like a ship in line ahead, making its steady fifteen knots where the roads are good and there is a free run, at other times gallantly ploughing through seas of mud, and clearing shell-holes with scarcely a wince. Watching the performances of the lorry on a mud slope after a night of rain prepares the mind to accept the accomplishments of the 'tanks' with a sober credulity. Lorry follows lorry into the place of death, and comes out at the other end at the same methodical pace, at the same correct distance from its fellows, for all the world like those amazing processional insects described by M. Fabre. In the war zone one gets a genuine affection for the lorry and a high esteem for its steady, faithful, plodding, persistent character. The French are admirable drivers of all motor vehicles, and one cannot speak too highly of the competence and discipline of their lorry-men.

"If everything could be left to the motor lorry there would be an end of the trouble. But there are also the troops going up and down, immense numbers of horses, and every variety of horse and mule traffic, from the big gun going up with a team of eight to the forage-cart drawn by a humble nag, the motor cyclist, the officer's car. The pack grows denser and the roads narrower and muddier as you get near the trenches. The car or the lorry cannot resist

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the temptation of passing the horse traffic, rushes out of line on a road which can just accommodate two vehicles, and presently makes a hopeless block with a convoy coming the other way. Fortunately in France there are no hedges by the roadside, and relief may be got by drawing the offenders temporarily into an adjoining field."

How the Light Railway Scores.

"The best solution is to relieve the roads of the heavier traffic by light railways built alongside them. Here the French have been extremely skilful and active, and we shall probably be wise to follow their example. The light railway both relieves the traffic and saves the road, which otherwise is called upon to bear an intolerable weight of heavy traffic. Let the light railway take the guns and the shells and the heavier stores, and even narrow country roads will manage the rest, and remain passable through winter. Fortunately for themselves, the French had the light railway habit before the war broke out. All through France you may see the line by the side of the road, which takes the country people to market and carries their parcels and produce. The engineering firms are used to it, and had the plant ready. So if you go to the advanced railheads you may see them discharging a chief part of their heavy stores into little goods trains, which go right up to where the trenches begin, and serve the big guns straight from the trucks. They are specially built to resist shell-fire, and have lightly armoured engines which are proof against shell splinters and shrapnel. When an army moves on the lines for these can be built more quickly than the shell-shattered roads can be repaired. I have heard Frenchmen go so far as to say that they are the key to the whole transport problem, and though that may be an exaggeration they are certainly very important."

First Life of the Lorry.—Motor Repair Shops.

"The wear and tear of all that appertains to transport is immense, and if delay is to be avoided it must be made good as far as possible, at or near the front. The French are by nature admirable mechanics, and have shown great skill and aptitude in devising repair-shops for all kinds of machinery. You go into a little country town which three years ago was wholly innocent of engineering, and find that an immense motor repairing shop has been constructed out of a collection of barns, flour-mills. I was told that one of these shops which I saw in a comparatively small town could turn out complete motors of various types. That is not its *métier* at present, but it was repairing lorries and military cars by the hundred, and returning them to the lines with astonishing rapidity. The motor lorry, if not mishandled, has an average life of eighteen months on the line before it goes into dock for the first time, and then, if carefully overhauled, it should be good for at least another year. Some of these shops are within sound of the guns, and one is conscious of the peculiar stimulus which is given to work by the near presence of the battle."

NORTHAMPTON TRAMWAYS PARCEL VAN.

Mr. J. F. Cameron, general manager of Northampton Corporation Tramways, has sent to us a photograph of a parcel van which he recently put into service at the small cost of £62 10s., including the

painting. The motor is an old 12-15 h.p. Humber chassis with three-speed reverse gear box, which was overhauled in the tramway shops, and is now working very satisfactorily. The vehicle is proving an important factor in the success of the parcel service.

THORNYCROFT CHASSIS IN PEACE AND WAR.

The accompanying photograph depicts a 40 h.p. type "J" van supplied by John I. Thorneycroft and Company, Limited, of Southampton and Basingstoke, to Messrs. Woof and Sutcliffe, carriers, of Burnley. The order was received by Messrs. F. Groome, Limited, the local representatives for the Thornycroft chassis, and the vehicle is similar to those being supplied in large numbers to the War Department.

The manufacturers will no doubt be interested to learn of an instance of the use of their chassis that probably has not come to their notice. From a statement describing the patriotic work of the Victorian Government Railways, issued in Melbourne, we observe that

Thornycroft 40-h.p. Type "J" Van.

the staff of the Newport workshops have constructed a motor hospital car, a travelling kitchen, and three ambulances for the use of the Victorian troops in the war. The hospital car has a Thornycroft chassis, which was previously in the use of the railway department, and at the time the new body was constructed to embody the ideas of Colonel Fetherston, the motor hospital was understood to be the first of its kind in the world. The car is practically a portable operating theatre. Its approxiamate weight is 5 tons, and the dimensions of the body are 10 ft. by 7 ft., it is 6 ft. 9 in. high. In the centre is a nickel-plated operating table, 6 ft. long by 18 in. wide, of which 18 in. at each end is hinged, and can be raised or lowered as required. A supply of hot water is provided by means of reservoirs under the car, in series with a filter, and a primus-heated boiler inside. The capacity of the reservoirs is over 60 gallons, and of the boiler 4½ gallons, and the latter is capable of raising 4½ gallons of water to the boiling point in 15 minutes. At the front end of the car are two nickel-plated hand basins, with hot and cold water taps, and two lotion basins. At the side are two sterilisers—a large one for linen, &c., and a small one for surgical instruments. Lighting is provided for by large windows at the sides and in the double door at the back, each window having adjustable canvas blinds inside and out. At night the car is lighted from acetylene gas fittings. The interior equipment is completed by numerous drawers, cupboards and racks for surgical instruments, linen, anæsthetics, antiseptics, etc. Underneath the car are racks for carbide, tins of petrol, a ladder, and a tank for kerosene.

London to Manchester.—The fleet of steam wagons which do the London, Birmingham, and Manchester journey of 200 miles each way, and which bear the name of Mr. J. T. Lawton, one of Manchester's leading motor haulage contractors, comprises six Sentinel vehicles, all shod with Spencer-Moulton solid rubber tires. The facts compiled with regard to the month of October show that all the vehicles did their task of carrying a maximum load of five tons each way every day. This is a notable instance of consistent running, and speaks well for the motor and tires, as well as for the drivers. As efficient service by tires is a feature to which attention is devoted by tramway and railway companies, the facts above related will interest intending buyers of tires for replacement purposes, or those firms who are placing orders for new vehicles. It is appropriate to mention that Messrs. G. Spencer, Moulton and Company, Limited, have been tire manufacturers to railway companies for over forty years, and that the firm has been in existence as india-rubber manufacturers for over sixty years.

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INSTITUTION OF AUTOMOBILE ENGINEERS.

PRESIDENTIAL ADDRESS BY MR. L. A. LEGROS, M.INST.C.E.

At the opening meeting of the Institution of Automobile Engineers for the session 1916-17, held on October 16 at the Royal Society of Arts, London, Mr. L. A. Legros delivered his presidential address. He thanked the members for the signal honour conferred on him in electing him as president for a second term, and said that the stirring times in which we live provide many heads, on some of which he could not help touching more or less imperfectly and very incompletely, because the field of thought laid open by the war is too vast for a general summary survey.

AUTOMOBILE ENGINES.

It had been suggested to him by a former president, Mr. Lanchester, that the special function of the automobile engineer, as contrasted with those of other engineers, was weight-saving, and that this Institution might well be said to represent the weight-saving engineers. In a paper read by Mr. Lanchester in 1906, the question of least weight was investigated theoretically in detail, and two years later by Mr. Mervyn O'Gorman in a paper on the "Weight of Motor Cars and Motor Car Parts," in which a new conception was introduced, namely, the "liveliness" of a car.

One fundamental conception, the study of which had contributed greatly to progress in automobile design, was torque. Most manufacturers plotted the records of their engine tests as curves of brake horse-power, many also plotted the torque curve and others the curves of fuel consumption. He (the president) had already expressed the opinion that the torque curve gave more information about the performance of an engine in a car than was apparent from the horse-power curve; moreover, it gave the data in the form in which they were actually wanted for all traction problems. An example of a torque curve was given early in the Proceedings (*Ibid.*, p. 245), but no general comparison of torque curves appeared to have been made up to the present. To remedy this deficiency he had made application to the best-known engine and automobile manufacturers in this country, in allied countries and in America, as well as to other authorities, with the result that he had been enabled to obtain curves and data for 130 engines. The leading dimensions and weights for these engines with and without flywheels were given in a table under the same reference numbers as were used in a series of 15 charts, which were appended to the paper.

To facilitate comparative examination of these curves the engines were separated into the following classes:—Commercial vehicles, public service vehicles, miscellaneous (engine builders), passenger cars (4-cylinder), racing cars, passenger cars (6-cylinder), passenger cars (8- and 12-cylinder), aero engines (vee), aero engines (vertical), aero engines (radial), aero engines (rotary), general summary. With a view to showing the decrease of weight per unit of torque (or, as plotted, the increase in the effective radius), he had made an endeavour to secure examples of the practice of six years ago as well as of that of to-day, but the figures for the first period were rarely kept sufficiently accurately to afford good evidence of the improvement effected. In the curves for commercial car engines, curve 2, Fig. 1, showed the drop due to governing. The range from maximum to minimum effective radius for different engines was about 2 to 1; the mean curves for this class, A, B, C, Fig. 2, showed an increase, in six years, of about 30 per cent. in speed and nearly 50 per cent. in effective radius at 1,100 revolutions per minute. The conditions of public service vehicles were so onerous and so many special provisions had to be made against mechanical failure or dropping of lubricant and for preventing noise, that it was not surprising to find that the mean curve for this class, while similar in form to that of the mean of the latest commercial vehicles, was some 15 per cent. lower. Having dwelt upon the facts indicated by the various curves, the president observed that the progress made in the motor had taken very different directions for different classes of work. In nearly every case there was an increase in range of speed and in maximum speed, as well as an increase in the effective radius of the engine. The 6-cylinder class formed an exception, for it showed on the average for each period a diminution in the effective radius as well as a distinct difference in the form of the curve.

The fuel question, to which the motor next brought them in line of direct thought, was a problem which had formed the subject of papers which had been discussed before this Institution. The questions raised were of great magnitude: first, that of assuring for the future a national supply of liquid fuel; and secondly, that of price due to the ever-increasing number of motors and of the purposes for which they were used. It was to be hoped that some interesting papers and discussions on this subject might be forthcoming in the near future.

EDUCATION AND THE NEGLECT OF SCIENCE.

From the motor, which symbolised the work done and progress made by the membership of the Institution, he would pass to its sponsor, the automobile engineer, and would begin with questions concerning his education which had occupied the attention of the Council, though the views which he expressed must not be taken as representative of that body. The broad question of the shortcoming of our whole educational system had been laid bare at meetings such as the one held at Burlington House on May 3, 1916, when Col. Crompton attended as representative of this Institution and took part in the discussion. It was difficult to imagine that any engineer, unless he had been at work in a neutral country far from the seat of war, could fail to have been impressed with the appalling ignorance of technical and scientific matters among those on whom the responsibilities for running this war had fallen. As one well-known engineer wrote to the newspapers:—"They say this is an engineers' war—I sometimes think an engineer should run it!" Never in the history of engineering had the ignorance of science by the politicians, the military, and the other authorities been so openly displayed as in the early stages of the war, and never had it proved so costly in time, in life, and in substance. The protagonists of the methods of the old schoolmen still pleaded for one hour a day for classics, but it could not be too clearly understood that this one hour in class might involve about double that amount of time in preparation, to the prejudice of work more important for any professional career dependent on sound training in science.

It should be abhorrent to the engineer to produce effects by slow or obsolete methods when better were available; no sane man would now think of apprenticing his son to a works in which neither miller nor grinder existed, and where all plane surfaces were still obtained by hammer, chisel, and file, though in the early decades of last century such shops produced the most *débrouillard* type of mechanic.

A knowledge of the classics was undoubtedly of value to men of the clerical, legal, literary, and even of the medical professions, but how much greater would have been the value in this present war of that small section which dealt with politics had it been as well grounded in the sciences as in the dead languages? How many millions and how many lives would the country have been saved if as much study in time and thought had been expended on science as on classics by the whole of our law-makers and law-givers?

If general knowledge is to be improved by generalising the system of education, it is of the highest importance that the technical teaching class, which forms so high a percentage of the total of professional men, should itself be reformed by a broader education in which science is given its proper part. But the earliest education of all was not in the hands of professional teachers, and, generally, elementary education required attention in still earlier years.

EARLY EDUCATION AND EXAMINATIONS.

It was instinctive in a child to be inquisitive: "Curiosity, thy name is engineer!" is a modernisation of an old saying for which they could thank Col. Crompton, for it is the child with highly developed curiosity that will best acquire that general knowledge which is essential in the engineering profession. It is of the greatest importance that in the early days of childhood correct conceptions should be formed of the laws of nature, and that those questions which arise in the child's mind should be correctly answered.

Passing from general knowledge to the particular knowledge required in the professions, they came to the examination test. He suggested that the systems of examination were greatly at fault, and that the fault was due to the prevalence of the classical ideal. Another matter that required reform was the teaching of drawing. If the mechanical drawing of his schooldays was then thirty years behind the times, that which was evidenced in the London matriculation papers of this year was also at least as far behind. There was also the tendency of examiners to fall into antiquated methods, which could be remedied or removed altogether by appointing active members of high standing in the engineering, chemical, and other professions allied to industry to act as advisers in the drawing up of curricula and in the setting of the examination papers. The form in which he had expressed these views was in great measure due to the consideration which the Council of this Institution and its committees had given to the qualifications of candidates.

APPRENTICESHIP.

Following on general education came the question of apprenticeship. It was the student deflected at the outbreak of war from the study of machine construction to the practice of munition making or to active service who will have suffered more than the apprentice who had then entered the shops or who had just finished his theoretical course of training; for the apprentice there never was an opportunity like the present for getting the best of work, excellent experience, and good pay, though frequently in a totally different

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branch of industry from that originally selected. The two cases were so different that the work done during the war years would need special detailed reference in applications for membership for many years to come, and the greatest care would need to be exercised by qualification committees in order to avoid unfair treatment of particular cases. This question had received the appreciation of the Senate of the University of London, who had elaborated a scheme for conferment of honorary (war) degrees. A great deficiency in our technical educational systems was the general absence of classes dealing with works organisation and works accounting, as well as absence of provision for the practical study of these necessary branches of technical knowledge for pupils and apprentices, who rarely had the opportunity to obtain more than an imperfect idea of a few details of a single system.

Employment—Technical Men for the War.

The senior Engineering Institution had decided that such a question as unemployment was outside its proper sphere, and had relegated it to a subordinate position under the Civil Engineers' Appointment Board, in which the main body of the Institution apparently took but little interest. On investigation he had found that the organisation of this Board was but imperfectly adapted to finding employment in any grade of responsibility above the most elementary. The next in seniority of the large institutions, that of the Mechanical Engineers, kept a register in which the information as to unemployed members was properly set forth, but its existence was by no means generally known to the members, and facility of reference was local to London. The Institution of Electrical Engineers, for legal reasons, does not undertake the question of finding employment for its members, nor has the question of re-employment during the transition period been considered.

Their own Institution had faced the problem in a different manner, paying the fee and having the power to act as a labour bureau without the obligation of advertising the fact, but confining its activity to its own membership. The result, he thought, had been that the officers of the Institution had been able to give helpful introductions to a greater percentage of those of the membership who had been unemployed than was the case with the other engineering institutions, and he believed that all those who had availed themselves of the facilities afforded them by this Institution were agreed in their appreciation of the services rendered to them.

At the beginning of the war the opportunity of taking up th strong position of finding the technical men that the Government needed was lost for two reasons. First, the position taken up by the Council of the senior Institution ; secondly, the essential difference of position of the engineer in the two services. The civil engineers had consistently refused corporate membership to Royal Engineers (or, as they styled themselves, sappers), though exceptions occur in the case of engineers who had retired from this branch of the service. It was unlikely that they would encourage membership of naval officers, though he found the name of one engineer lieutenant R.N. (member) and of one lieutenant R.N. ret. (associate member) in the 1914 list of members. To make this point clear he referred to the history of the struggle for recognition by naval engineers, and emphasised the difficulty, amounting almost to impossibility, of any effort being made from within the service to obtain such recognition. In his reference to the question the president observed that an improvement was effected by the Osborne scheme for training cadets, and said that actually the spirit of caste and social distinction had been practically broken down before the commencement of the war now raging.

This problem was one of great national importance, and it was to be noted that, as in the present instance, the leading engineering institutions held aloof from the matter, though they were fully cognisant of the struggle for emancipation by their brother professional men, men on whom the exigencies of their employment enforced the seal of silence. It was not his desire to see the older institutions relapse into the condition of mere examining bodies for, apart from finding the means to encourage research and standardisation, that was the end that the Institution of Civil Engineers and the Institution of Electrical Engineers were rapidly approaching, but there should have been some properly constituted body to which the Government could have applied for the brains and specialised ability in engineering which, during the war, it had from time to time required for different departments.

Far from the reason for such an amalgamation of interest no longer existing, it would be still more cogent when peace was declared and when, in addition to some 4,000 trained engineers to be released from the services, the mass of garage men, Long Acre salesmen, butchers, bakers, and candlestick-makers were thrown upon the brain market, with a spurious hall-mark of ability implied by the position they occupied during the war, a position which these unqualified men could never have occupied had the suggested properly constituted body been in existence.

He repeated, this was an engineers' war, but it was more particularly a mechanical and automobile engineers' war; for the civil, mining, and electrical branches of engineering, while taking their great and due share of the work, had not been responsible for the creation of either ordnance or munitions or for military transport of a kind and on a scale never before contemplated. Yet the mechanical engineer was not a recognised factor in the army! There was no chief mechanical engineer corresponding to the engineer-in-chief of the fleet, and it had been necessary to create a Ministry of Munitions to deal with vital questions of production ; the same applied right down the scale, with the result that men of high mechanical ability and qualifications were officered by men with only ordinary military knowledge or mere administrative capacity. It was for the recognition of the mechanical engineer as a unit in the service to be officered by men of his own profession that the engineering institutions should agitate, preparing their case now, and postponing action till immediately after the war. The twenty-two years of agitation for the American naval engineer, and the twenty-five years of delay from the "pouring of oil by a Lascar" view to incipient recognition of the engineer officer in the British Navy should be a sufficient warning as to the slowness of procedure in normal times of peace.

The War and Dilution of Labour.

Passing to the question of what they were doing towards winning the war, he said that it would not be fair to compare the total number of members, or even the percentage of membership, of the various engineering institutions at present with the colours, as many so serving had not notified these bodies, nor could account be taken of overlapping. From replies which he had received from the secretaries of the civils, the mechanicals, and the electricals, and from their own returns, it would appear that about 5,000 professional engineers had joined the services.

To those who have travelled in the United States or on the Continent the difference between the labour conditions in this and many other countries had become more and more apparent. Certain branches of trade were regarded as the provinces of skilled men, and no other could work at them ; even training at Polytechnics and other schools was regulated by trade union views as far back as 1899.

With the war, and later with the realisation of the magnitude of the enemy output as compared with our own, it was necessary to consider repetition work on a scale hitherto unprecedented. But time was required to appreciate the conditions of modern warfare as elaborated by the enemy nations, time was needed for politicians to grasp the full meaning of the change, and still further time to educate the labour leaders as to the great part those they represented had to play in the struggle. Even now, however, one could find many instances in which Belgian workmen, working for piece or bonus under equal conditions side by side with British workmen, earn much bigger wages ; at this we need not be surprised, for the Britisher, as he had seen in America, was capable of working "all out" when he was so far away from home that he could not walk back. At the present time dilution by unskilled and woman labour was proceeding rapidly, old prejudices and narrow-minded views are being swept aside for the one ideal—that of winning the war.

If one act stood out above all others, as showing the grasp of the problem taken by the then Minister of Munitions, it was the fact that the rate of production set by him was far greater than that demanded by the military authorities ; he took account not merely of the *increase* in the demand, but of the *rate of increase* in the demand ; in other words, he thought in terms of acceleration when his technical advisers only thought in terms of velocity. So successful had this work of dilution been that in some of the national shell factories the woman labour amounted to as much as 95 per cent. of the total. Nor had dilution only been applied to those classes of work in which repetition by the million or by the thousand took place, but it had been found that very many other classes of work could be done after but short training by men previously reckoned unskilled, and particularly by women. Of work done by women at the present time, selected from an ever-widening field, he took the following examples :—All varieties of machine shop work, such as drilling, boring, shaping, slotting, keyseating, milling, surface-grinding, universal grinding, tool-setting, fitting, skilled assembling, and erecting. Women were making equal progress in such industries as woodworking, aeroplane building, boiler-making, laboratory work, optical work, and instrument making, as well as in nearly all branches of ordnance, small arms, shell, and explosive work. They had also successfully taken up such occupations as driving overhead travelling cranes, shipyard and building cranes, motor testing, and inspecting and testing materials of all descriptions involving the use of micrometers, verniers, surface gauges, and other measuring instruments, including the slide-rule. In fact, so wide was the scope of woman labour that a well-known member

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of this Institution, who had taken a leading part in the dilution campaign—and his view was not a solitary one—had stated to him his firm conviction that, given two more years of war, he could build a battleship from keel to aerial in all its complex detail and ready for trial entirely by woman labour.

AFTER THE WAR.

Already far-sighted politicians had discussed the transition period which must follow the war before normal peace conditions were resumed; the stability of our social fabric depends to a great extent on the accuracy of their forecast, and on the efficacy of the means devised to bridge this dangerous period. The automobile engineer, and for that matter every engineer, daily had to face problems of labour and material measured in length, mass, time, and money; a discussion on the subject of after-war conditions, not necessarily to be reported in the Proceedings of the Institution, might prove to be of great interest, and might bring to light some clear views on this difficult subject, a subject that was made the more difficult by the fact that the Allies now number many nations, and that our countrymen would form but a small minority if the plebiscite of all nations of the *entente* were to be taken.

If, as some thought, we were to adopt American standards, to work as hard and for the same hours as in the United States, to draw good money, and to adopt a standard of living higher than we knew it before the war, the only difficulty might be with the business men, or so-called business men. For the present conditions of holding in, ca' canny, or whatever term one likes to apply to them, now fortunately being abandoned for the higher standard, are equally the fault of the employer and employed. The same employers who had cut the price of labour to the lowest limit had frequently treated their technical engineers equally badly, cutting estimates and salaries in half, and making the conditions such that the business had speedily come into the hands of debenture holders.

Progress in the mechanical trades depended upon the invention of new machinery and the devising of new and improved methods of manufacture; at present these new fields offered but little inducement to the engineer, who knew that such incipient industries only too frequently came to grief from inadequate trust in the engineer or other technical adviser, from the cutting down of the conditions and salaries before work was commenced and from the excessive rapacity sometimes shown by the debenture holders. American machinery had maintained a high and very uniform standard for accuracy in length, mass, and time. The repetition method applied to highly specialised factories had enabled the manufacturers of the United States to produce machinery to the requisite and to uniform commercial limits of accuracy; they delivered it free without extra for packing, they furnished particulars of weights, countershafts, etc., in advance, and, in normal circumstances, they delivered to time; the war had brought them their due reward for these standardised commercial limits.

It was to the sacredness of the written agreement (with the avoidance of undue cutting of prices in the first instance) and to the determination to work our hardest that we must look if the future was not to be darkened by the cloud of anarchy, but which might easily come over us if all workers of every class did not realise that they would need to earn higher pay and to draw it. There was amongst our politicians at least one that could unconsciously differentiate acceleration from velocity: in the president's humble opinion this ability constituted an essential factor in the difference between statesmanship and politics, and it rested with him and with those who might have similar powers of thought to steer the ship of State through these dangerous and rock-strewn waters.

PETROL ALLOWANCES.

As the result of a visit to the Petrol Control Committee by the chairman of Glasgow Corporation Garage Committee, the former body have agreed to restore the normal supply of petrol on the understanding that the cars will be used on Corporation business only. The supply had been cut down to 25 per cent. of the original consumption.

NEWCASTLE CORPORATION'S CURTAILED SUPPLY.

In the annual report of the Newcastle Corporation Tramways department it is stated that owing to the difficulty of obtaining petrol, and latterly to the restrictions placed on the quantities available, the motor omnibuses, which were expected to serve as feeders to the system, have had to be taken off certain routes, and at the present time only one omnibus can be employed on the Westerhope route daily and one on the Benton and Annitsford routes respectively on Saturdays only.

MOTOR VEHICLES FOR MUNICIPALITIES.

GOLCAR COUNCIL have obtained prices and particulars of steam wagons.

STIRLINGSHIRE CONSTABULARY have purchased a motor bicycle and side car.

DARTFORD RURAL COUNCIL have agreed to purchase a steam tractor at a cost of £500.

DEWSBURY COUNCIL are considering a recommendation for the purchase of a motor wagon.

LEEDS COUNCIL have accepted the tender of Merryweather and Sons for supplying a motor fire engine.

STOCKTON COUNCIL have applied for sanction to purchase a steam wagon for the haulage of stone at £593.

MANCHESTER WATCH COMMITTEE contemplate acquiring a petrol vehicle for the removal of lunatics, sick prisoners, etc.

SALFORD TRAMWAYS COMMITTEE have ordered two 2-ton motor chassis from Halley's Industrial Motors, Limited, Glasgow.

MARGATE COUNCIL have decided to obtain a motor fire engine, at £1,165, subject to obtaining sanction to borrow the money.

DUNDEE DISTRICT COMMITTEE have placed an order for a road tractor, two wagons, and a sleeping van at a cost of over £900.

NORTHALLERTON STANDING JOINT COMMITTEE are providing motor cycles and side cars for the chief police officers in three districts.

LONDON COUNTY COUNCIL have placed an order with Leyland Motors, Limited, for the supply of two motor fire engines, at £907 each.

ROTHERHAM COUNCIL have received Treasury sanction for borrowing £735 for the purchase of a motor tipping wagon for the electricity works.

SALFORD HIGHWAYS COMMITTEE have placed with Fodens, Limited, Sandbach, an order for a steam motor wagon, fitted with a jib crane.

HALIFAX TRAMWAYS COMMITTEE have placed an order with Halley's Industrial Motors, Limited, Glasgow, for a 3-ton petrol motor tower wagon.

BACUP AND ROSSENDALE COUNCILS are considering a scheme for the provision of a motor ambulance. It is proposed that the fire brigades should unite for dealing with the outbreaks of fire, and that the Bacup steam engine should be sold and the proceeds devoted towards the purchase of the ambulance.

WOLVERHAMPTON TRAMWAYS COMMITTEE have agreed to purchase an electric lorry and car to enable the department to deal more expeditiously with breakdown work, repairs and testing, and also to permit of greater supervision being exercised. The sum to be paid for the lorry is £370 and for the car £217.

ABERDEEN COUNCIL have purchased a second-hand steam tractor, at the price of £250, for the use of the Streets and Roads Department. The Streets Committee estimate that the vehicle will save the department £150 per annum. The Electricity Committee are considering a proposal to purchase a battery-propelled coal tipping wagon.

GLASGOW ELECTRICITY COMMITTEE, who have had four electrically propelled delivery vans in use for some time, have added an electric 5-ton automatic tipping wagon for the conveyance of ashes from generating stations. Another electric wagon is in course of construction for the same department, and one is on order for the Cleansing Department.

DOVER ELECTRICITY COMMITTEE have deferred until after the war their consideration of the engineer's proposal for the purchase of a battery-propelled tipping wagon for the cartage of coal. The engineer had received offers of a 5-ton steam vehicle at £619, and an electric 4-ton wagon at £1,200, and he advised that the latter would be cheaper. He estimated that it would enable him to convey the coal at a cost of 1s. 3d. per ton, as compared with the present charge of 1s. 8d.

OMNIBUSES AND PAYMENT ON ENTRY.—Interviewed regarding an appeal made by Miss Violet Markham to omnibus and tramcar passengers to pay fares to women conductors on the step, a representative of the London General Omnibus Company said that to make such a practice general a new type of omnibus would have to be provided on the lines of the P.A.Y.E. system on cars in America. There would have to be a wider platform, and the staircase would have to be inside the entrance of the omnibus in order to check the top deck fares. The company supported Miss Markham's appeal to the extent of asking the public to pay isolated fares on the platform.

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MOTOR TRAFFIC.

MOTOR TRAFFIC NOTES.

TRUCK MAKERS IN THE UNITED STATES.—There are 50 manufacturers of heavy commercial petrol motor vehicles in the United States of America.

NEW HACKNEY CARRIAGE LABEL.—From December 1, motor cars exempted from duty as hackney carriages must carry circular plates lettered "Hackney Carriage" above the number plates.

OMNIBUS AID DURING TRAMCAR CURTAILMENT.—As far as possible the motor omnibuses owned by the Birmingham Corporation Tramways Department have been used to minimise the inconvenience caused by the curtailment of the tramway service due to the breakdown at the generating station during the past four weeks.

NINE MONTHS' PETROL IMPORTS.—For the nine months ended September 30 the quantity of motor spirit imported into Great Britain and Ireland was 123,310,642 gallons, valued at £7,311,074, as compared with 105,718,000 gallons, valued at £3,714,078 for the corresponding period last year, and 97,123,125 gallons, valued at £3,514,265, for that of the year 1914.

A MODEL FOR CORPORATION GARAGES.—Glasgow Corporation Committee on the Motor Car Central Garage have recommended that two members and the general manager of the tramways should visit London to inspect a very large garage erected by the military authorities at Camberwell Green, with a view to obtaining information as to the more efficient and economical working of the Corporation garage.

THE OLD-TIME OMNIBUS CONDUCTOR.—During the hearing of an appeal at Shoreditch by a motor omnibus conductor under the Military Service Act, the Mayor remarked that before the ticket system was introduced in the old horse days the conductors were all "swells," and the omnibuses had never paid so well since. He knew one or two who owned racehorses, and ran them at Alexandra Park Races. On those occasions they were clothed in approved "sporting" style, wearing large "acid drops" on their fingers.

MUNICIPAL ENGINEERS AND MOTOR TRANSIT.—Much as road engineers may deprecate the use of motor vehicles on roads not constructed for that traffic, the Institution of Municipal and County Engineers are always glad to avail themselves of modern facilities for locomotion at their district meetings. On the occasion of a South-eastern District meeting at Worthing, on October 28, the members had motor omnibuses placed at their service by the Worthing Motor Services, Limited, to enable them to visit the municipal works of the borough.

MOTOR CAR'S UTILITY TO A RAILWAY CHAIRMAN.—At a hearing of a charge at Edinburgh against the chauffeur to Mr. Whitelaw, chairman of the North British Railway, for failing to report under the Military Service Act, Mr. Whitelaw gave evidence that the car the man drove was used to convey witness to different parts of the railway. It was chiefly on railway service; and he contended that the railway service badge exempted the man from military service. The North British Company had always held that no railway servant could attest without the company's permission. The Sheriff held that the man was liable for military service as he was not a railwayman.

DELIVERIES OF ELECTRIC VEHICLES.—Drake and Gorham, Limited, Felix Street, Westminster Bridge Road, have recently delivered 15 electric battery trucks and lorries, including two tipping wagons and a 1-ton lorry to the Chester and Manchester Corporations; 1-ton lorry each to Blackpool and Glossop Co-operative Societies; two lorries of 3 and 4 tons capacity to Greenall, Whitley and Company, Limited. The Broughton Copper Company, Limited, and Richard Johnson and Nephew, Limited, have each taken delivery of two trucks; and lorries have been sent to Brunner, Mond and Company, Limited, Levinstein, Limited, J. and J. M. Worrall, Limited, and Deakins, Limited. Several of the firms have placed repeat orders.

GOVERNMENT ALLOWANCES FOR USE OF PRIVATE CARS.—On October 6 the Army Council notified that the payment to be made to owners of private cars used on Government work would be 5d. per mile for a car with two or three seats and 7½d. with four or more seats. The old rates were 4d. and 6d. respectively. The new allowances may be drawn even in cases where an owner receives the benefit of the concession of the Finance Act, and is repaid or exempted from car and petrol licence duty on the ground that his car is used in connection with naval or military service, including ambulance or hospital work. The new rates will not, however, apply in cases in which petrol is obtained substantially below market price, either from army stores or under any other arrangements. The old rates will continue to be drawn in such cases.

MOTOR CAR CAUGHT BETWEEN TWO TRAMCARS.—At Aberdeen, on October 12, a farmer was charged with having, on the night of August 16, in King Street, near the junction with Seaton Place, driven a motor car recklessly and negligently, and, while passing a tramcar then proceeding northwards along the west side of the rails, attempted to cross from the east set of the rails to the west side of the street at an angle in front of another tramcar going southwards, whereby the motor car was jammed between the front parts of the two tramcars. The defence was that defendant went to the right-hand side as there might have been passengers waiting to board the tramcar, besides which he thought the light of the approaching car was further away than it was. The Sheriff imposed a penalty of £5. As the result of the collision a passenger in the motor car was seriously injured.

DAMAGES AWARDED AN OMNIBUS DRIVER.—At Bow County Court the driver of a motor omnibus was awarded £55 damages with costs against West Ham Corporation for personal injuries. The evidence showed that at Burnham Street tramway junction a tramcar belonging to the Corporation began to turn into that thoroughfare owing, it was alleged, to the points not being properly set. The car collided with an omnibus driven by plaintiff, who had his arm badly strained in manipulating the steering wheel, and had to be absent from work for six weeks. The motorman did his best to avert the collison. Prior to the mishap another car had been turned into Burnham Street, and plaintiff contended that there had been negligence on the part of the conductor in not seeing that the points were properly replaced, so that other cars could proceed along the main road. The defence was that a heavy fall of rain must have washed mud between the points, preventing them from closing, but Judge Graham advised the jury that as this had not been proved it was a mere surmise.

PROVINCIAL OMNIBUS OWNERS AND EXCESS PROFITS DUTY.

The *London Gazette* of October 27 publishes an order of the Board of Referees, granted on the application of the Provincial Omnibus Owners' Association, under which an increase is allowed in the statutory percentage of profit before the excess profits duty becomes payable. As from the commencement of the Act the statutory percentage is increased to 8 per cent. in the case of a trade or business carried on or owned by a company or other body corporate, and to 9 per cent. in the case of any other trade or business. The order gives the appended definition of the parties to whom the concession refers:—"The business carried on by persons who, owning mechanically propelled omnibuses, chars-a-bancs, wagonettes, and other similar carriages, constructed to carry a number of people, not less than ten, whether at separate fares or not, use these vehicles to ply for hire on public roads, or who let them out for hire—such business excluding that of railways, tramways, light railways, and trackless trolleys, and including only such part of any business as falls within the terms hereinbefore mentioned; and no part of any business is the subject of this application unless either no licence is required from any licensing authority, or unless the licensing authority whose authority is required is not the Commissioner of Police for the Metropolis (London)."

INSTITUTION OF AUTOMOBILE ENGINEERS.

The first general meeting of the session of the London Graduates of the Institution of Automobile Engineers was held on October 26, when Mr. T. D. Carpenter read a paper on "Factory Organisation," Mr. L. H. Pomeroy (vice-president) being in the chair. In the course of his paper the author dealt with the functions of the various departments of the factory and their method of producing results. He pointed out that the works manager should be the driving force of the works staff, and should attend not only to matters of importance but also to details. The designs and drawing office should be responsible for producing a practical design with working drawing, correct in all details, before the actual production is commenced. Operations should be arranged in proper sequence, time-saving tools designed, the minimum times of operations deduced, and waste movements eliminated. The author outlined the functions and duties of the ordering department, the stores, the costing department, and the experimental department. He recommended the adoption of the premium bonus system as the only method of obtaining output at a minimum cost, the advantage being that both the worker and the employer benefit from it.

An interesting discussion followed the paper, and some valuable hints in regard to organisation were given by the chairman.

ELECTRIC VEHICLES IN THE U.S.A.—*The Electric Vehicle* reports that the value of battery vehicles in America is £4,158,000, those operated in the United States Government service being valued at £87,000.

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

BARRY RAILWAY COMPANY.

STORES.

The Barry Railway Company are prepared to receive tenders for the supply of General Stores and Materials, including iron, oils, steel, timber, varnishes, waste, wire ropes, etc., for six or twelve months from January 1, 1917.

Specifications, with form of tender, may be obtained from the undersigned.

Applicants are requested to particularise the stores for which they wish to tender.

After forms have been obtained samples and patterns can be seen between the hours of 10 a.m. and 4 p.m. (Saturdays from 10 a.m. to 12 noon) at the storekeeper's office, Broad Street, Barry.

Sealed tenders, endorsed "Tender for ," to be in the hands of the undersigned not later than 10 a.m. on the 20th day of November, 1916.

The Company do not bind themselves to accept the lowest or any tender.

E. T. LAWRENCE,
Secretary.

Company's Offices,
Barry Docks, Glam.
November 1, 1916.

CITY OF BELFAST.

TRAMWAYS DEPARTMENT.

TENDERS FOR THE SUPPLY OF TRAMWAY PASSENGER TICKETS.

The Tramways and Electricity Committee are prepared to receive tenders for the supply of Tramway Passenger Tickets for a term of One Year from January 1, 1917.

Specimens of the tickets required and form of tender may be obtained upon application to the General Manager, at the Tramway Office, Sandy Row, Belfast.

The estimated annual requirement is 70 millions.

The Committee do not bind themselves to accept the lowest or any tender.

Tenders, endorsed "Tenders for Tickets," are to be addressed to the undersigned, and must be received at the City Hall, Belfast, not later than eleven o'clock a.m., on Monday, November 20, 1916.

A tender, if sent by post, must be registered; if delivered by hand, an official receipt must be obtained for it, otherwise the undersigned will not be responsible.

R. MEYER, Town Clerk.

City Hall, Belfast.
November 7, 1916.

GREAT NORTHERN RAILWAY COMPANY (IRELAND).

The Directors are prepared to receive tenders for the purchase of about 1,300 tons of Scrap Metal of various kinds.

Particulars and forms of tender may be obtained on application to the Secretary. Tenders, made out on the company's forms, should be delivered under sealed cover, endorsed "Tender for Old Materials," to the undersigned not later than 10 a.m. on Thursday, November 23, 1916.

The directors do not bind themselves to accept the highest or any tender.

T. MORRISON,
Secretary.

Secretary's Office,
Amiens Street Terminus, Dublin.
November 3, 1916.

COUNTY BOROUGH OF ROTHERHAM.

DOUBLE DECK TRAMCARS.

The Tramways Committee of the Rotherham Corporation are prepared to receive tenders for the supply and delivery of six Electric Double-deck, Top-covered Cars.

Full particulars and information can be obtained on application to the General Manager, Mr. E. Cross, Tramways Depôt, Rotherham.

The firm whose tender is accepted will be required to enter into a contract which will contain the usual "Fair Contract Clause." Tenders endorsed "New Cars," to be sent to me not later than Thursday, November 16.

CHAS. L. DES FORGES.

October 31, 1916.

POSITIONS VACANT.

JUNIOR SHIFT ENGINEER.

Junior Shift Engineer wanted to assist on evening shift. Commencing salary 30s. per week. Must be ineligible for military service. Apply, stating age, experience, and copies of testimonials, to CHIEF ENGINEER, Electricity Works, Canterbury.

Wanted, man capable of taking charge in the absence of Foreman of all work carried out in Tramway Depôt. Apply, stating age, experience and wages required, to BOX No. 20, THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.

ADMIRABLE SITES FOR WORKS, FACTORIES, ETC.

The Great Central Railway passes from the Metropolis northwards through the centre of industrial England, throwing out its branches eastward and westward to the coast. Its lines run over the great coalfield which extends into the counties of Yorkshire, Nottinghamshire, Derbyshire, and Lincolnshire, thus affording an easily accessible source of fuel supply.

This coalfield is the largest in the British Isles, and was estimated by the Royal Commission on Coal Supplies (1905) to cover not only an area of approximately 4,066 square miles, but also to contain not less than forty-nine thousand million (49,000,000,000) tons of coal. The Lancashire and North Wales Coalfields are also traversed by the Company's lines.

The new eastern port of Immingham should particularly attract traders, as its modern equipment and accessibility at any time of the day or night, irrespective of tides, are important time and labour saving factors.

Adjoining the Great Central railroad at various parts of the system are situated Valuable Sites for Works, where, by the introduction of siding accommodation, goods can pass right into and directly out of the works, which greatly assists the manufacturer to attain his desired position in the world's markets.

For information please communicate with the G.C.R. Publicity Office, 216, Marylebone Road, London, N.W.

Owners and agents of land and buildings for sale or to be let near the Great Central Railway are requested to send particulars to the G.C. Estate Office, 12, Paton Street, Piccadilly, Manchester.

SAM FAY, General Manager.

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SATURDAY, NOVEMBER 11, 1916.

ORDERLY CAR LOADING.

Attention has been directed in these columns on more than one occasion to a method of securing the formation of queues that has been in successful use for a number of years in Southwark Bridge Road, London. It has recently been adopted at Halifax and Huddersfield. The system is capable of being applied to a terminus that has to provide for the loading of cars for several destinations, and it can be made to answer that purpose without the erection of a group of barriers on one spot, an impossibility in many busy thoroughfares. Four or more routes are served in Southwark Bridge Road, the cars being drawn up, not end to end, but at intervals of two or three lengths on both sets of lines on the Thames side of the cross-overs. Both at Halifax and Huddersfield the necessity of orderly loading has been enforced by the increased traffic that the war has brought, combined with the fact that the calling up of motormen for military service has reduced the number of cars running. Several routes terminate in Commercial Street, Halifax, and as barriers for queues would present an obstacle to the general traffic the management several weeks ago tried the formation of queues at the terminus in readiness for filling incoming cars. Although this course has obviated the crushing hitherto witnessed, it has lacked expedition when a number of cars has had to be dealt with, and the plan, similar to that in vogue at Southwark Bridge terminus, of allowing incoming cars to discharge their passengers a few yards in advance of the new starting points has been adopted. In a similar manner passengers for three routes have been dealt with for a week past at the Market Street terminus in Huddersfield, an inspector and two constables superintending the formation of the queues for a few days. In view of the great increase of traffic throughout the country there is every reason now that the nation is being disciplined by the war, why passengers should be speedily trained to abandon the disorderly habit that has been too long tolerated on many tramways. In our issue of September 14 it was reported that the queue had been introduced at Princes Square terminus, Wolverhampton, and also that over three hundred persons had been seen formed up in orderly array awaiting a West Vale car—one of the routes dealt with at Huddersfield Market Place. Another good sign is that the Bradford Watch Committee and the tramways department last week began to put in operation the barrier system of loading in Forster Square. Police and tramway authorities of other towns may be reminded that in March last the Watch Committee of Bradford, with the approval of the Corporation, decided to obtain the sanction of the Board of Trade to a regulation that requires six or more intending passengers to form up in line or queue when waiting at any stopping place named in a schedule attached to the regulation and to enter the car in that order. Prior to the war a regulation of this description absurdly enough had to be obtained by Parliamentary Bill, and now that the power to grant it has been delegated to the Board of Trade other towns would be well advised to follow the example of Bradford.

RESTRICTION OF SERVICES AND LIGHTING.

Subdued lights under a canopy are being affixed to the overhead wires at termini of the London County Council Tramways.

As a result of the street accidents that have occurred in Bradford during the past month, the public lighting is being altered in such a way that it will meet the requirements of the Order, and at the same time render the streets safe both for pedestrians and vehicles.

Salford Council have discussed the lighting restrictions, which several members consider are too severe and constitute a danger. Alderman Linsley, chairman of the Tramways Committee, stated that a number of accidents had resulted.

Under the latest lighting edict the Plymouth tramcars have been deprived of illumination of the destination indicators. The Tramways Committee have been locally urged to insist on the restoration of the lights.

The lighting of the top decks of the Sheffield cars is stated to be insufficient to enable the inspectors to check tickets.

At Oldham the tramway service has at times been disorganised by falling wires, due, in many instances, to the conductors not being able to see the wires when reversing the trolleys, owing to the darkened streets. The result has been that the guard wires have been pulled down on the top of the trolley wires, thus causing delays through the current being off.

In order to lighten the strain on the motormen, Derby Tramways Committee propose to suspend the Sunday service from November 12 until after the war, although on Sunday the cars are a source of considerable profit, especially in the summer. There are not sufficient motormen available to enable the men to be relieved one day per week.

Lincoln Council have agreed to the car service terminating at 9 p.m. instead of 10 p.m.

The South Shields tramway service between Fowler Street and the Pier head is to be stopped early in the evening. It is proposed to restore the headlights of the cars for the benefit of the drivers and the safety of the public.

Portsmouth Council have agreed to the car service being suspended 1½ hours earlier than at present owing to the dangerous conditions now existing. On the day that the change is made the cars that will be released will be utilised to improve the service on one or two routes during the busy period.

A recommendation has been presented by Sunderland Tramways Committee that from November 13 the service be discontinued at 10.30 p.m. each day until April 1 next.

More than one method has been adopted by the Cardiff Tramways management to secure the sufficient obscuration of the car windows to meet with the approval of the chief constable. First the curtains were drawn and tied together. The next step was the colouring of the windows, but this method prevented passengers from seeing their whereabouts. To overcome this objection, a clear strip of glass about two inches deep is left at a convenient height on each window. The City Council on November 2 referred back a report of the Watch Committee on the lighting of the streets with a view to securing an improvement. Sir John Courtis, chairman of the Tramways and Electricity Committee, observed that the administration of the Order was left to the discretion of head constables. In Cardiff the head constable appeared to administer it as though the city was similarly situated to Grimsby. In Cardiff, owing to the existence of central standards in the streets, the darkness was especially dangerous to traffic.

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RELAXATION OF PETROL RESTRICTIONS.

The Petrol Control Committee announce that new licences (free of duty) for the purchase of motor spirit for use in hackney and commercial vehicles and in industrial processes will be issued to holders of licences which expire this month. The new licences will cover a period of six months.

An application for the renewal of a licence which expires in November should be made on the form attached to the licence at page 7, and should be sent to the Secretary, Petrol Control Committee, 19, Berkeley Street, London, W., between November 16 and 25.

Holders of free of duty licences who for special public services have already received a supplementary allowance of motor spirit cannot be granted any further increase. The Committee are prepared to consider applications from those who have not received a supplementary allowance for an increase not exceeding 10 per cent. of the amount authorised in their existing licences.

PERMITS FOR MOTOR CONSTRUCTION.

On November 6 the Minister of Munitions gave notice that he "prohibits until further notice any person, firm, or company engaged in the manufacture or repair of any vehicle designed for mechanical transport or traction, or any part of such vehicle, from carrying out in any factory, workshop, or other premises, without a permit issued under the authority of the Admiralty, the Army Council, or the Ministry of Munitions, any work consisting in the manufacture, assembling, or erection of any new or unused motor internal combustion engine, designed or adapted for mechanical traction, or of any new or unused motor cycle, motor chassis, motor wagon, or of any tractor or other motor vehicles of any kind propelled by mechanical means, except work required to complete contracts placed by the Admiralty, the War Office, the Ministry of Munitions, or an Allied Government on or before the date of this Order." Repairs or replacements are not affected by the Order.

SCARCITY OF ACCOUNTANTS.

COST OF MUNITIONS EXCEEDS TOTAL PEACE EXPENDITURE.

The Ministry of Munitions is still appointing accountants of military age. In giving the reasons for this action, the Ministry points to the necessity of securing and retaining the services of a sufficient number of skilled accountants in view of the fact that the expenditure for which the Ministry of Munitions is responsible is greater than the total annual national expenditure before the war. The supply of suitable accountants who are ineligible or unfit for military service became exhausted some months ago, and it has therefore been impossible to fill vacancies or provide for expansion of work without engaging a certain number of accountants who are fit for military service. Most of the work is highly specialised, and can only be entrusted to members of one of the recognised institutes of accountants, as they alone possess the essential status, experience, and training.

MISCELLANEOUS NEWS AND NOTES.

Repairs at Aberdeen.—The council have authorised the carrying out of repairs to the permanent way.

Silvered Pennies.—Counterfeit coins, including a penny silvered over to represent half a crown, have recently been passed on girl conductors on the Edinburgh Tramways.

Track Renewal at Dundee.—A report has been presented to the Tramways Committee stating that seven miles of single track will need renewal after the war, and that a portion of the work is urgent.

New Offices and Shelters.—Plans have been submitted to Morecambe Council for the erection of a new tramway office and a shelter for passengers near the central pier. Lythan Urban Council are considering plans for a tramway shelter at Ansdell.

A Bad Example.—Four tramway motormen and four women conductors at Kingston were ordered to pay £1 each towards the costs for travelling on the L. and S.W. Railway without paying their fares, with intent to defraud the company of one penny each.

Staff Car at Bradford.—Since women employees became so numerous on the Bradford tramways a car is set apart for conveying them from the city to their homes along the Duckworth Road route. It leaves at 12.30 a.m., and also carries general passengers.

Higher Charge for Energy.—From April 1 next Dover Electricity Committee will increase the charge for energy supplied to the tramways by 20 per cent., in order to help to meet an anticipated deficit, more than half of which is due to additional interest on loans.

Problem of Incapacitated Employees.—Several applications for re-employment have been made to Bournemouth Corporation by men who have been discharged from the army incapacitated, and the officials have been authorised to deal with the cases pending their further consideration.

Rotherham's Need of More Cars.—Six new double-deck tramcar are being obtained for the Corporation Tramways. The need for more cars is shown by the increase in the number of passengers. For the half-year ended September 30, they totalled 7,839,083, as compared with 4,159,824 for the corresponding period of 1912, while the receipts have risen from £19,299 to £34,343.

London Electric Railway Extension.—It is probable that the running of through electric trains between the Baker Street and Waterloo Railway and Watford on the London and North Western Railway will be begun early in the new year. Owing to the war, there is delay in the completion of the joint rolling stock, but pending this, some of the London underground electric railway companies will give the use of some of their spare stock for the purpose.

Petrol Restrictions. The Commercial Motor Users' Association has summoned an emergency meeting of its general committee to consider the question of the motor spirit allotments for the next six months. It is stated that the increases granted are not fair, amounting in thousands of cases to only 10 per cent. for commercial users, while many private owners of cars have obtained 100 per cent.

Ex-Soldiers and Trolley Head Cleaning.—According to the Borough electrical engineer of Walthamstow, it is a difficult matter sufficiently to train discharged soldiers so that they become competent cleaners of trolley heads. At least six months' training is required, he informed the local tribunal in asking for the exemption of a cleaner, 23 years of age, who performed overhauling work as well as cleaning. The man, however, was directed to enter the army.

Trees Dangerous to Traffic.—As the result of the gale on Nov. 5 an oak-tree, standing in the grounds of Kingston Place, was uprooted and fell across the wires of the London United Electric Tramways just as a force of special constables and the Kingston Voluntary Aid Detachment had passed by. As another tree was in a dangerous state the special constables pulled it down, the tree falling across the wires. The car service was interrupted for several hours.

Mannesman Tube Works.—The Town Clerk of Newport has, says the "Western Mail," reported to the Parliamentary and Improvement Committee that he has been officially informed that the shares of the Mannesman Company have now been acquired by British interests, that the company have made arrangements to go on with the Newport undertaking, and that the Government have sanctioned the raising of the necessary capital. It is hoped that the first section of the works will be completed by next midsummer.

Siemens Bros., Ltd.—Mr. Pretyman, in a printed reply to a question in the House of Commons, states that Mr. George Chauvin is the managing director of Siemens Bros., Ltd., but Mr. Carl von Siemens is no longer a director. The firm is a controlled establishment doing Government work, and is under a supervisor. It is greatly to the national interest that this business should be acquired by those British firms who can make the best use of it for the future development of the electrical industry of this country. Active steps to that end are now in progress, and meantime it is clearly necessary that the business should be fully maintained.

Conductor Refused a Leaving Certificate.—On the application of a conductor on the Huddersfield Corporation Tramways the local Munitions Tribunal have refused to grant a leaving certificate to a conductor who desired to return to his trade. Mr. R. H. Wilkinson the tramways manager, informed the tribunal that he had only one application from a woman for the position of conductor within the last month, and it was impossible to obtain women now for the work. As soon as the twelve conductors were taken into the army the tramway service would have to be reduced if the male conductors could not be trained as drivers. The decision affected several other cases.

Condition of Cardiff Wood Paving.—In view of the urgent need for repairs to the chief streets of Cardiff Sir John Courtis, chairman of the Tramways Committee, on November 2 asked for a declaration of the policy of the Public Works Committee. Alderman W. Roberts replied that to relay the roads with timber at its present prices would be folly. Where they were able to do repairs without treating long lengths of road they were doing them. Alderman Sir John Courtis opposed the policy of waiting till the war was over. Although the price of timber was high, it was likely to remain high for some time after the war. Unless something was done they would soon have to start digging people and cars out of the roads.

An Industrial Truce.—In its political notes on Thursday, "The Times" stated that the Government Reconstruction Committee are about to appoint a sub-committee to investigate after-war labour problems, with special reference to the project for securing an industrial truce during the reconstruction period. Mr. Whiteley, Chairman of the Committee of the House of Commons, will probably preside over the committee. A committee of the Labour Party are also giving their minds to this question. A preliminary meeting between representatives of the Parliamentary Committee of the Trades Union Congress and the Employers' Parliamentary Committee will be held in London on Wednesday or Thursday next.

Dangerous Driving of an Omnibus.—At East Ham on November 7 the town clerk conducted the prosecution of a motor omnibus driver for driving in a dangerous manner, and also in such a way as to obstruct a tramcar. The car had reached the bottom of the incline of the sewer embankment, when defendant, driving a motor omnibus, overtook the car, and when he had nearly passed on the off side, he turned the omnibus. It struck the car with such force that the latter was knocked off the metals over the footpath, broke down a fence, and the front part overhung a field two or three feet below. The stipendary magistrate said defendant was evidently anxious to get ahead of a rival vehicle, and the consequences might have been serious. For the dangerous driving he imposed a fine of 20s., and allowed £4 7s. costs.

Increase of Traffic.—A glance at the column of tramway and omnibus Traffic Returns in this issue will show that only eight of the undertakings included have experienced a decrease in their aggregate receipts. One of the most notable instances of greatly increased takings is that of the Leeds Corporation Tramways, which are doing a record business. For the past 32 weeks of the financial year the takings amounted to £311,710, an increase of £28,511. At this rate the profits, which last year amounted to nearly £72,000, will be greatly exceeded this year. A very large outlay will be required, however, for repairs and renewals, as that work is at present confined to such repair as is necessary to secure safe running. Neither labour nor material is available for more extensive operations.

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Glasgow Inspector's Appeal.—At Lanarkshire Appeal Tribunal on November 6, an unattested ticket inspector employed on the Glasgow Tramways appealed on the ground that he was in a reserved occupation and also on conscientious reasons. The military representative read a letter from the tramways manager stating that the undertaking had no officials who were designated traffic inspectors. About 99 per cent. of the work of ticket inspectors was to inspect tickets. Applicant stated that all the other inspectors had attested and were exempted. A member of the Court stated that he saw no reason why the manager should differentiate between the ticket inspectors. The tribunal granted exemption on the ground that applicant was in a certified occupation, but granted leave to the military representative to appeal.

Ambulance Drivers Needed.—The Joint War Committee of the British Red Cross Society and the Order of St. John still need a number of additional voluntary motor ambulance drivers, and have also openings for a few paid drivers. Men who offer themselves for the work must be ineligible for general military service (Category A). Applicants, who must be of British birth, must be thoroughly experienced motor drivers. Volunteer drivers must be prepared to give their services for a minimum period of six months, or for the duration of the war. Billets and rations are provided by the societies, but the volunteer driver is expected to pay for his own uniform. Further particulars can be obtained from the Motor Ambulance Department, Room 106, British Red Cross Headquarters, 83, Pall Mall, S.W.

Sunday Running and the Charge for Energy.—A sub-committee has been appointed by Llandudno Urban Council to consider an offer made by the Llandudno and Colwyn Bay Railway Company to pay a higher price for energy if the authority will waive their objection to Sunday traffic and rescind the by-law with reference thereto. The company have pointed out that it is only by the reciprocal measures suggested that the Council can escape a burden which is at present onerous, and may continue for some considerable time, as in the opinion of experts it is improbable that coal prices can return to normal for some years. The company's offer is made in reply to the council's request that the agreement concerning the supply of energy should be varied, as under present conditions the council is losing heavily. Unless they are given the opportunity of earning additional revenue the company state that they cannot respond to the request.

Fined for Giving a Starting Signal.—A passenger, 16 years of age, was summoned at Dudley for signalling a car at the terminus and was fined 40s., the presiding magistrate remarking that a serious accident might have happened. It appeared that the inspector on duty whistled for the car to start, whereupon the woman conductor rang the bell. Receiving an answering signal she released the back brake. At the time the motorman had taken a parcel to the parcels office, and when returning he heard the several signals. The car started and he ran round to the front and got in, where he saw defendant holding the bell cord. The motorman brought the car to a standstill near the station. Mr. J. A. Shepherd, who appeared for the South Staffordshire Tramways Company, stated that an accident had happened under similar circumstances, resulting in loss of life and costing the company a sum exceeding four figures.

Manufacture of Copper Wire Restricted.—The Minister of Munitions has issued an order prohibiting as from November 6 the manufacture of any copper wire or any cable containing copper, except for the purposes of any of the following contracts or orders for the time being in existence, namely:—

(1) A contract or order to which there shall have been allocated by the Priority Branch of the Ministry of Munitions a reference number and priority classification within Classes "A" or "B" of circular L. 33 as to control of output issued by the Minister of Munitions on March 31, 1916, or

(2) A contract or order with and bearing the reference number and identification letters of any of the following Departments, namely:—The Admiralty, the War Office, the Ministry of Munitions and the Post Office.

Rochdale Motorman's Presence of Mind.—By the manner in which he applied his knowledge as to the course to be adopted by passengers on a runaway car, Motorman J. Hill, of the Rochdale Corporation Tramways, undoubtedly saved many persons from serious injuries in an accident on November 2. At 5.30 a.m. a workmen's double-deck car, carrying thirty persons, after ascending the gradient of Peel Brow, Shawforth, jumped the rails at the points. When it had been restored to the rails it began to run backwards before the conductor could board it. The motorman asked the passengers to lie down on the floor, and most of them followed his advice. He was not able, however, to bring the vehicle under full control, and after running a quarter of a mile it left the rails, collided with a standard, and overturned, part of it overhanging a stone wall guarding a dyke. Although the car was wrecked, only nine passengers received injuries, which were not serious in more than one case. Their escape is attributed to the passengers having remained quiet on the floor.

Concessions to Employees.—Increases of wages ranging from a farthing to a halfpenny per hour, with overtime at the rate of time and a quarter, have been granted to the overhead equipment staff of Leeds Tramways department.—West Hartlepool Corporation have increased the war bonus to their workmen by 1s. a week.—The Bournemouth Tramways employees have expressed their thanks to the Corporation for the increased war bonus, but the depôts and permanent-way men have asked the Tramways Committee for an increase of wages also. The committee informed a deputation that they could not advise the council to entertain the application, and their action has been approved of.—Friendly meetings are taking place between Southport Tramways Committee and representatives of their employees respecting the application for the standard rate of wages as fixed by the Lancashire Council of the Tramways and Vehicle Workers' Association.

Inspector's Whistle Averts a Serious Mishap.—Inspector J. T. Lead, of the Potteries Electric Traction Company, was in Longton Market Square, where two cars were standing, at 10.45 on a recent night, when he saw another car coming from Fenton at a fast speed. It was driven by Motorman E. Jones, to attract whose attention the inspector blew three blasts on his whistle, but he failed to slacken the speed, and the car ran into the first stationary car, knocking it against the second one. The result of the incident was that the company, represented by Mr. G. C. Kent, prosecuted the motorman at Longton police court, on October 27, for drunkenness while in charge of the car. Mr. Kent informed the bench that the accused was an old and trusted servant of 15 years' service, but the company felt that in fairness to the public they must prosecute. The motorman of one of the stationary cars stated that when he heard the whistle he set his car in motion backwards, thus reducing the impact, which damaged the front of his car, and also the controller. In imposing a fine of 45s. the magistrate said that had it not been for the prompt action of the inspector, whom they wished to commend, a serious accident might have happened.

Failure of Power Supply at Birmingham.—Alderman Jephson, chairman of the Electricity Committee, has stated that the regularity of the tramway service is not likely to be much improved until the middle of December, because the electricity department is being kept waiting for plant that they expected to have had installed by the end of September. As the result of a consultation between the tramways and the electricity supply managers, it has been decided not to notify the public that between certain hours the cars would stop. The electric supply department were certain that the cars could and would run in the mornings until about 9.30, and in the evening they were certain to maintain a full service from six o'clock onwards, as well as during the dinner period. The tramways department, which is in no way responsible for the failure of the electricity department to maintain the regular supply of energy, thought it was wise to take the risk between the hours mentioned, because if there was a fine day and the coal was good, the electric supply department would be able to maintain the supply to the cars all day. Wet and poor coal has a very serious effect upon the output when the plant is running up to its full capacity, as is the case at present. Notwithstanding the interrupted and restricted services, the aggregate receipts for 30 weeks on the cars show an increase of £66,720 and £3,899 on the motor omnibuses. The latter vehicles have proved very useful during the breakdowns of the tramway service.

National Service of Newcastle Tramways.—In his report for the year ended March 31 last—Mr. Ernest Hatton, engineer and general manager, attributes the increase in income mainly to the influx of skilled labour in the district. The increase in expenditure, owing to the abnormal conditions, has, however, been in a greater ratio than the increase of income. Traffic expenses increased by £14,503, which was principally due to an increase in wages and war bonuses. Owing to the employment of women conductors who have had to be provided with uniforms, there was a considerable increase under this head. In general expenses there was an increase of £9,000, no less than £6,000 of which is attributable to rates; third party claims and insurance against aircraft being responsible for the balance. During the year £9,582 was paid to the city in relief of rates. Restrictions being placed on the use of petrol, the motor omnibuses, which were expected to serve as feeders to the tramways, have had to be withdrawn from certain routes. Owing to the absence of street lighting, the employment of a large number of newly trained men and women and the necessity of providing services for a large number of munition workers, it would appear that the Newcastle tramways have had to work under conditions which have not prevailed in any other town, and that no tramway system in the country has done so much for the conveyance of men employed on work of national importance. "Every available car, both morning and evening, week in and week out, including Sundays, has been at the disposal of the workmen in the area without regard to cost," but the tramways committee felt that under the circumstances it was an absolute necessity. Included with the report are several striking photographic illustrations of coupled cars and double exit cars, heavily loaded with munition workers. These cars were introduced about a year ago, and were described and illustrated in the TRAMWAY AND RAILWAY WORLD of April, 1916. Mr. Hatton thinks it doubtful whether the working expenses will show much reduction for some considerable time, as the repairs and renewals to track, cars and plant have been held in abeyance. The deficiency will have to be made up subsequently, and this means unduly large expenditure.

PERSONAL.

2nd Lieutenant C. P. Everson, son of the general manager of Plymouth Corporation Tramways, has been reported missing since he was wounded on October 2.

Mr. W. A. Cocking, engineer of the British Automobile Traction Company, Ltd., has received a commission in the Royal Engineers, and has left London to undertake important work abroad.

Mr. H. P. Maybury, engineer and manager to the Road Board, has gone to France with Sir Eric Geddes, the Inspector-General of Transportation to the British Expeditionary Force.

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Mr. E. V. Hiley, town clerk of Birmingham, has tendered his resignation, having accepted a seat on the board of directors of the Metropolitan Carriage, Wagon, and Finance Company, Ltd., of which Mr. Dudley Docker, C.B., is chairman.

Ex-Conductor W. J. Booth, of Wigan Corporation Tramways, who has been serving for some time in the army, has been recommended for commissioned rank. The distinction has been conferred, and 2nd Lieutenant Booth has received the congratulations of the Tramways Committee.

Mr. J. A. Barkley, general manager at Cape Town for the Cape Electric Tramways Company, resigned his position in November last owing to ill-health. **Mr. W. F. Long,** formerly municipal electrical engineer of Cape Town, was appointed manager, and he began his duties at the beginning of February last. Shortly after his appointment labour troubles arose, which culminated in April with a strike on the part of a considerable number of motormen and conductors. This continued for about four weeks, and during the whole of the time, with few exceptions, the system was kept running full time. Eventually many of the employees returned to work on the terms offered by the company, and the strike collapsed. The directors remark, in their annual report, that there is every reason to hope that the company's relations with the employees are now established on a satisfactory basis, and they attribute the result to the energetic action and tact displayed by Mr. Long and the local directorate.

Mr. J. McMahon, general manager, Colombo Electric Tramways, died suddenly on September 14. At the funeral the hearse was drawn by employees of the tramways, and the inspectors carried the coffin to the grave. Mr. McMahon went to Ceylon in 1898 in connection with the construction of the Colombo Tramways, which were opened in January, 1899. Since then he had been in the service of the company, rising from the position of chief inspector to that of general manager. He was held in high esteem by the company and was beloved by his subordinates.

CONTRACTS AND ORDERS.

Crompton & Co., Ltd., are supplying a motor and starting panel to Ilford Electricity Committee.

The General Electric Company, Ltd., have a contract to supply switchgear for a sub-station of the Bacup electricity works.

Hadfields, Ltd., have an order to supply special track work to Newcastle Tramways Committee.

Messrs. Cammell, Laird & Co., Sheffield, are supplying 200 tires to Hull Corporation Tramways at £41 10s. per ton.

Shanghai Council have placed a contract with the General Electric Company of China for Osram lamps for street lighting for twelve months.

Motor Tower Wagon for Halifax.— Halley's Industrial Motors, Ltd., Glasgow, are supplying a 3-ton motor tower wagon to Halifax Tramways Committee.

Briggs, Jones, and Gibson, Ltd., have a twelve months' contract for the supply of uniforms to the inspectors, motormen and male conductors of Salford Tramways department.

Salford Council have placed an order with Halley's Industrial Motors, Ltd., for a 2-ton chassis for the Tramways department, and with Fodens, Ltd., Sandbach, for a steam wagon fitted with a crane.

Wolverhampton Council have agreed to purchase an electric lorry and car for the Tramways department, in order to provide a more efficient means of transit for breakdown work, repairs, testing and supervision.

Melbourne Car Lighting. - The Tramways Board offer a premium of £100 for the most suitable design for the lighting of 1,250 cars with lights of approximately 100 candle power each. Tenders recently sent in did not prove satisfactory, the fault in most cases being the expense of working, according to the "Australian Mining Standard."

Manchester Corporation have allotted contracts as subjoined:— Cable, British Insulated and Helsby Cables, Ltd.; Western Electric Company, Ltd.; Callender's Cable and Construction Company, Ltd., turbine feed pump, G. and J. Weir, Ltd., Glasgow; sub-station switchgear, Ferranti, Ltd., Hollinwood; copper trolley wire, F. Smith and Company, Ltd., Salford.

Sheffield Electricity Committee have placed the following contracts: Two turbo-alternators, switchgear, and alterations to pipework at Neepsend and Sheaf Street generating stations, C. A. Parsons and Company, Ltd., £10,000, plus 5 per cent. for contingencies; 20 panels of h.t. two-phase sub-station switchboards, A. Reyrolle and Company, Ltd., Hebburn-on-Tyne, £2,709; 10,000 3-in. cast-iron cable pipes, Staveley Coal and Iron Company, Staveley, at £7 10s. per ton.

FINANCIAL REPORTS AND MEETINGS.

Question of Double Taxation.— The question of the double taxation to which Colonial businesses are subject was discussed at a private meeting of Australian merchants held in the city recently. It was decided to act in conjunction with the Association to Protest against the duplication of income-tax within the Empire in convening an influential meeting to bring the matter before the Chancellor of the Exchequer.

United Electric Tramways of Caracas.— The accounts for the year ended June 30 show a disposable balance of £14,328, against £15,750. The directors recommend a dividend for the year of 7 per cent. (less tax); £2,428 forward. Last year the dividend was the same, but a bonus of 1½ per cent. was paid, with £1,300 forward. The percentage of operating expenses to gross receipts is 53.10, or 1.72 per cent. more than the previous year, due to the larger mileage run and higher cost of material and working.

Excess Profit Duties.— The Tramways and Light Railways Association recently made application under the Finance (No. 2) Act, 1915, to the Board of Referees for an increase in the statutory percentage as respects the business of tramways and light railways in Great Britain and Ireland, where such tramways or light railways are running wholly or in large part over public roads or streets. The Board have now ordered that as from the commencement of this Act the statutory percentage should be increased to 7½ per cent. in the case of a company or other body corporate and to 8 per cent. in the case of private owners. On the application of Melbourne Electric Supply Company, Ltd., the statutory percentage has been raised to 7½ per cent. for companies and to 8½ per cent. for private firms. In the case of the electric supply and electric traction in India the same increases have been allowed.

Double Income Tax and British Trade.— Speaking at the meeting of the Auckland Electric Tramways recently, the Chairman alluded to the manifest inequity of the present system of double income tax within the Empire. The matter has been receiving a good deal of attention lately, and an influential association is in existence with the object of using every possible endeavour to rectify the present unjust system. The Government have publicly admitted the grievance, and some measure of relief has been provided in the Imperial Finance Act of 1916, under which a proof of payment of Colonial income tax of not less than 1s. 6d. in the £ repayment can be claimed on the difference between the rate of 3s. 6d. in the £ imposed for the second half of 1915 and the rate of 5s. imposed for this year. The injustice is so glaring and the injurious effect on British trade so serious that the payment cannot be long continued.

BUSINESS NOTES.

The International Time Recording Company, 57, City Road, London, E.C., have issued a folder illustrating and describing their dial and car recorders, including a recorder that automatically prints the wages sheet. A useful contrivance, especially for offices and parcel delivery undertakings, is a time stamp and date record, which is described as the only totally automatic one. The company also supply card racks for use in connection with card time recorders.

In view of the enlargement of many electrical and other engineering undertakings to meet needs arising from the war, the issue of a new edition of "Water Purification for Industrial Purposes" is a timely publication by the Paterson Engineering Company. This volume of 64 pages is printed on art paper, and the various filters and softeners and oil eliminators are illustrated by coloured views. The firm's products are in use in generating stations and other works throughout the Empire. Included in the volume are notes on the importance of a suitable water supply for industrial purposes, and full descriptions of rapid filtration, softening and oil elimination processes. The company's office premises in India House having been requisitioned by the Government, they have opened temporary offices at Windsor House, Kingsway, W.C.

Attention was recently directed in these columns to a solid-tyre catalogue with a novel feature, namely, a series of card cut-outs showing the exact size of each section of tire manufactured by Messrs. G. Spencer, Moulton and Co., Ltd., whose solid tire department head office is at 230, Deansgate, Manchester. The feature referred to has created considerable comment among heavy motor users, and also amongst those who employ light delivery vans. So great has been the demand for this list (No. 101) that a third edition has been printed, and copies may be had on application to the address given.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-four of the principal tramway undertakings in the United Kingdom for the week ended October 28 give total receipts of £181,162, or £14,888 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or sixty-six more than for the corresponding week. The receipts this year were at the rate of £81 4s. 0d. per mile of single track, and last year at the rate of £76 17s. 5d., thus showing an increase for the week of £4 7s. 4d. per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

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ABCHURCH YARD, CANNON STREET,
LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914.	Cash. Nov. 9.	A Week Ago.
5%	5%	Alabama Traction, 5% 1st. Mt.	—	67	74½	70½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4¼	65/-	63/9
4%	4%	Do. 4% Deb. ...	100	91	69	69
4½%	4½%	Do. 4½% Deb. ...	100	98½	74⅜	74
5%	5%	Do. 5% Deb. ...	100	96	69	68½
1/-	7d	Auckland Elec. Trams. Ord. ...	1	1⅝	21/-	21/-
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	94½	94½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅛	10 1/16	10⅜
4½%	4½%	Do. 4½% Deb....	100	96	83	83
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	91½	91½
$1	$1	Brazilian Trac. & Power Ord. ...	$100	66	54½	56½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	92	92
4/-	4/-	Brisbane Elec. Trams. Old. ...	5	7½	6¾xd	6¾xd
2/6	2/6	Do. 5% Cum. Pref.	5	5	85/-	85/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	58⅞	58⅞
6%	5%	Do. Pref. Ord....	100	106	56½	56½
5%	5%	Do. 5% Cum. Pref.	100	103	70	70
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	88⅜	86⅜
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	66	66½
—	£3*	Brit. Elec. Trac. Ord.	100	—	35½	35½
—	6%	Do. 6% Cum. Part Pref. ...	100	—	76⅜	77
5%	5%	Do. 5% Deb.	100	92	82½	83½
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	69¾xd	71xd
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	81½	81½
3/-	6/6	Calcutta Tramways, Ord. ...	5	7½	6 13/16xd	6 13/16xd
1/3	1/3	City of B.A. Trams.	5	5½	86/3	85/-
5/-	4/-	Dublin United Trys. 6% Pref.	10	12	11	11
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79⅜	79⅜
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	27/6	27/6
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅞	2/1½	2/1½
6/-	6/6	Lanarkshire Trys. Co.	10	10½	9 15/16	9 15/16
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9 3/8d.	9 3/8d.*	Llandudno & Colwyn B. Ord. ...	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	1/8	1/6	2/4½
6d.	6d.	Do. 5% Pref.	1	1/16	7/6	8/-
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	64½	64½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88	89½
5%	5%	Do. 5% Inc. Deb.	100	88½	79½	80½
4%	4%	Lon. Unt. Trns. 4% 1st Mt. Db.	100	55	47½	47½
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	96/6	96/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	66⅔	66⅔
8½	8½	Manila Elec. R. R. & Light ...	$100	102	68	68
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	75½	75½
$1½	$1½	Mexico Trams. Common ...	$100	70	31½	31½
5%	5%	Do. 1 Mt. 5% G.B.	—	84	43½	43½
6%	6%	Do. 6% Mt. Bds.	100	76	30	33½
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95	95
1/-*	1/2½*	National Steam Car	1	15/16	19/6	20/1½
9 3/8d.*	9 3/8d.*	New General Traction	1	¼	7/9⅜	7/9⅜
8 3/8d.	6d.	Northern Gen. Trans. Ord. ...	1	2 1/16	15/4½	15/4½
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	70/-	68/9
5%	5%	Do. 5% 1st Deb.	100	89½	74½	74½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80⅜	80⅜
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	1 1/16	10/-	11/3
10d.	8d.	Provincial Trams. Ord.	1	⅝	17/-	17/-
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84/-	84/-
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	91½	91½
5%	5%	1st. Mt. 5% 50 yr.	100	89½	75½	75½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	90	90
5%	5%	Do. 5% Perp. Deb.	100	99½	77½	77½
—	—	Singapore Elec. Trams	5/-	½	4/10½xd	4/10½xd
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	96½	96½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	81	81
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	98	98
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	77	77
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	9/3	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	99/6	99/6
—	—	Metropolitan Dist. Ord. ...	100	21⅜	14½	16
—	—	Undgd. Elec. Rys. of London ...	10	2⅜	33/9	35/-
		Do. "A"	1/-	⅜	6/-	5/4½
4½	4½	Do. 4½% Bds of 1933 Rd.	—	99	101⅜	101⅜
6	6	Do. 6% 1st Cum. In. Db.	100	114	101½	101⅝
6	6	Do. 6% In. Bonds Rd. ...	—	88	89½	89½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1915	1916	Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	Nov. 4	£54,194	£53,120	45	£2,243,663	+ £3,370
Auckland.....(28 days)	Oct. 20	20,831	21,428	16	84,286	+ 1,160
Ballarat and Bendigo ...	Sept. 10	3,075	2,850	24	18,720	+ 611
Brazilian Traction Mlrs.	Sept.	6,494,000	6,920,000	39	61,249,000	+3,791,890
Brisbane	Oct.	31,880	32,760	44	330,420	+ 23,466
British Columbia.....$	Sept.	517,022	540,440	13	1,629,026	+ 94,155
Buenos Aires Lacroze ...	Oct. 4	42,516	39,670	17	151,615	+ 13,184
Burmah Tramway ... Rs.	Sept.	22,163	23,749	9	48,161	— 839
Calcutta.....Rs.	Nov. 4	59,988	68,243	45	2,989,022	+ 146,074
Cape Town	Aug.	...	13,394	...	...	...
Carthagena & Herrerias..	Oct.	2,169	2,539	44	25,139	+ 7,390
Cordoba	Sept.	13,210	13,389	26	84,554	+ 648
East India	Oct.	2,069	2,080	13	7,125	+ 736
Hong Kong .....$	Oct. 7	12,289	14,443	43	583,912	+ 142,590
Kalgoorlie	Aug.	3,165	3,021	35	20,479	— 1,640
La Plata	Oct.	4,405	4,435	44	42,057	— 227
Lima	Sept.	30,530	33,348	39	364,058	+ 15,777
Lisbon .....Escu.	Sept.	...	194,276	...	...	...
Madras .....(2 weeks)	Oct. 31	31,293	31,819	43	633,910	+ 45,027
Manila	July	23,750	33,700	31	887,739	+ 39,986
Manaos .....Rs.	Aug.	...	147,774	...	...	...
Melbourne	May	...	69,275	...	...	...
Montevideo	Sept.	25,070	26,711	48	319,643	+ 15,626
Pernambuco	Nov. 5	3,240	3,453	44½	133,988	— 1,605
Peruvian .....$	Oct.	806,900	945,590	18	3,588,830	+ 482,773
Port Elizabeth	Aug.	...	2,863	...	...	...
Rangoon	Oct.	4,886	5,043	44	46,371	— 1,844
Shanghai .....$	Oct. 13	28,298	33,337	...	...	...
Singapore .....$	Sept. 30	11,524	12,989	39	490,501	+ 51,323
Toronto.....$	Sept.	804,902	913,535	39	8,005,764	+ 855,159
Winnipeg	Sept.	261,982	267,497	39	2,461,454	— 51,995

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	1916	Incr. or Dec.	Wks.	Aggregate. 1916	Incr. or Dec.
Aberdare U.D.C.	Oct. 31	£373	£403	+ 30	31	£12,279	+ £1,390
Aberdeen Corporation...	Nov. 1	1,838	1,841	+ 3	22	43,130	+ 2,376
Accrington Corp.	" 1	511	540	+ 29	31	18,273	+ 699
Ayr Corporation	" 4	239	272	+ 32	25	12,177	+ 1,054
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	" 5	1,317	1,594	+ 277	31½	48,901	+ 5,039
Birmingham Corp.	" 4	15,212	14,377	— 835	31	510,370	+ 65,885
Do. Motor Omnibuses	" 4	806	1,014	+ 208	31	31,325	+ 4,088
Blackburn Corp.	" 1	1,099	1,086	— 13	31½	40,851	— 1,083
Blackpool & Fleetwood.	" 4	425	435	+ 10	43	41,583	+ 4,863
Blackpool Corp.	*	...	...	...	...	...	...
Bolton Corporation	" 5	2,600	2,884	+ 284	32	92,767	+ 6,550
Bournemouth Corp.	" 8	1,728	2,047	+ 319	32	77,341	+ 5,823
Bradford Corporation ...	Oct. 28	5,914	6,358	+ 444	30	210,937	+ 7,719
Brighton Corporation ...	Nov. 5	951	1,097	+ 146	31½	42,245	+ 4,425
Bristol	" 3	9,651	10,480	+ 829	44	445,758	+ 23,537
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation	" 4	1,492	1,696	+ 204	32	55,426	+ 3,188
Burton-on-Trent Corp...	" 5	269	287	+ 18	31	8,791	— 488
Bury Corporation	" 5	1,252	1,343	+ 91	32½	46,355	+ 2,175
Cardiff Corporation	Oct. 21	2,540	2,993	+ 453	29	89,500	+ 8,031
Chatham & District	Nov. 2	1,082	1,234	+ 152	44	54,643	+ 2,791
Chesterfield Corp.	" 2	248	242	— 6	31	8,836	+ 297
Colne Corporation	" 4	238	258	+ 20	...	...	...
Cork Electric	" 2	461	499	+ 38	44	22,628	+ 328
Croydon Corporation ...	*	...	...	...	...	...	...
Derby Corporation	" 7	979	1,160	+ 181	31½	36,302	+ 2,717
Dover Corporation	*	...	...	...	...	...	...
Dublin & Lucan	" 3	126	130	+ 4	18	3,200	+ 243
Dublin United	" 3	5,784	6,250	+ 466	44	268,543	— 498
Dundee City	" 1	1,354	1,369	+ 15	24½	34,537	+ 802
East Ham Corporation	" 4	1,200	1,283	+ 83	31½	41,681	+ 284
Exeter Corporation	" 3	333	388	+ 55	31	12,912	+ 549
Glasgow Corporation	" 4	21,877	23,786	+ 1,908	22⅜	529,295	+ 38,303
Glasgow Subway	" 4	1,156	1,255	+ 99	44	50,431	+ 4,359
Glossop (U. Elec. Supp.)	" 4	122	145	+ 23	45	6,281	+ 624
Halifax Corporation	Oct. 31	1,935	1,875	— 60	30½	71,281	+ 957
Do. Motor Omnibuses	" 31	40	47	+ 7	30½	1,555	— 40
Hastings & District	Nov. 3	761	808	+ 47	44	46,930	+ 3,017
Huddersfield Corp.	" 4	2,440	2,722	+ 282	31	90,392	+ 7,947
Hull Corporation	" 4	3,139	3,218	+ 79	31	97,982	+ 1,685
Ilford U.D.C.	Oct. 28	582	625	+ 43	30	21,164	+ 1,114
Ilkeston Corporation ...	*	...	...	...	...	...	...
Ipswich Corporation	Nov. 4	474	437	— 37	31	16,919	— 950
Isle of Thanet	" 4	250	286	+ 36	5	1,510	— 58
Kilmarnock Corp.	" 4	153	169	+ 16	24½	4,422	+ 93
Lanarkshire	" 2	2,144	2,312	+ 168	44	102,228	+ 14,760
Lancashire United	" 1	1,613	1,774	+ 161	44	81,070	+ 4,235
Leeds City	" 4	8,736	9,641	+ 905	32	311,710	+ 28,511
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	" 4	738	864	+ 126	24½	22,216	+ 2,685
Leyton U.D.C.	" 2	1,409	1,520	+ 111	31	52,931	+ 1,042
Liverpool Corporation...	Oct. 28	12,963	14,265	+ 1,302	43½	610,047	+ 32,431
Llandudno & Colwyn B.	Nov. 3	213	221	+ 8	48½	17,977	+ 1,156
London County Council	Oct. 18	45,962	48,920	+ 2,958	28½	1,408,250	+ 140,908
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation...	*	...	...	...	...	...	...
Maidstone Corporation..	Nov. 2	189	196	+ 7	31	7,038	— 130
Manchester Corp.	" 4	17,151	18,641	+ 1,490	30	595,524	+ 32,024
Met. Elec. Trys.	*	...	...	...	...	...	...
National Steam Car	*	...	...	...	...	...	...
Nelson Corporation	" 4	172	198	+ 26	31¼	6,808	+ 540
N'castle-on-Tyne Corp.	" 4	6,375	6,998	+ 623	31	210,478	+ 10,876
Newport (Mon.) Corp.	" 4	773	1,057	+ 284	31	30,293	+ 3,474
New St. Helens & Dist.	" 1	902	1,056	+ 154	18	21,398	+ 1,537
Northampton Corp.	" 3	635	735	+ 100	31	22,413	— 1,065
Nottingham Corp.	" 2	3,478	3,859	+ 381	31	123,367	+ 5,461
Oldham Corporation ...	" 1	607	699	+ 92	31	31,617	+ 3,642
Portsmouth Corp.	" 4	2,126	2,404	+ 278	...	...	...
Preston Corporation	" 1	941	1,130	+ 189	30½	34,621	+ 4,311
Provincial	" 4	2,036	2,046	+ 10	5	11,086	+ 436
Reading Corporation	" 2	723	904	+ 181	30½	27,113	+ 2,130
Rhondda Tramways	" 2	1,185	1,326	+ 141	44	56,872	+ 4,991
Rochdale Corporation...	" 4	1,573	1,655	+ 82	31½	57,525	+ 2,268
Rotherham Corp.	" 8	1,196	1,629	+ 433	31½	49,767	+ 12,468
Salford Corporation	" 6	4,928	5,401	+ 473	30	175,264	+ 7,806
Sheffield Corporation...	" 5	9,275	10,588	+ 1,313	32½	340,056	+ 52,588
Southampton Corp.	" 1	1,451	1,771	+ 319	30½	32,698	+ 4,891
Southend-on-Sea Corp...	" 1	607	699	+ 92	31	31,617	+ 3,642
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	" 4	751	821	+ 70	31½	26,680	+ 1,263
Sunderland Corp.	" 5	1,469	1,631	+ 162	31	52,107	+ 4,039
Sunderland District...	" 1	544	575	+ 31	1	575	+ 31
Swindon Corporation ...	" 1	179	199	+ 20	30½	6,455	+ 204
Torquay Tramways.....	" 2	419	498	+ 79	44	26,848	+ 2,147
Tyneside Trys. & Tmrds.	" 1	540	582	+ 42	18	12,440	+ 950
Wallasey Corporation ...	" 4	1,081	1,222	+ 141	31½	44,752	+ 2,780
Walsall Corporation.....	" 4	762	814	+ 52	45	36,413	+ 3,361
Walthamstow U.D.C....	" 4	703	992	+ 219	31	35,514	+ 6,000
Warrington Corp.	Oct. 26	448	509	+ 61	30	14,962	+ 1,250
West Ham Corporation	Nov. 2	2,761	3,160	+ 399	30½	101,840	+ 4,408
Wigan Corporation	" 2	1,509	1,701	+ 192	31	52,650	+ 4,395
Yorkshire (W. Riding)...	" 5	1,715	1,802	+ 87	45	79,383	+ 7,964

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THE

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

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WEEKLY LIST OF TENDERS INVITED.

NORTH EASTERN RAILWAY.

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York. R. F. DUNNELL,
November 11, 1916. Secretary.

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ELECTRIC CABLE AND WIRE.

The Commissioners of H.M. Works, etc., are prepared to receive tenders for the supply of electric cable and wire during a period of one year from January 1, 1917.

Forms of tender, conditions, of contract and all particulars may be obtained on application to the Controller of Supplies, H.M. Office of Works, King Charles Street, Westminster, S.W.

The Commissioners do not bind themselves to accept the lowest or any tender.

Tenders must be delivered before 11 a.m. on Monday, November 27, 1916, addressed to the Secretary, H.M. Office of Works, etc., Storey's Gate, London, S.W., and endorsed "Tender for Electric Cable and Wire."

H.M. Office of Works, etc.
November 10, 1916.

GREAT NORTHERN RAILWAY COMPANY (IRELAND).

The Directors are prepared to receive tenders for the purchase of about 1,300 tons of Scrap Metal of various kinds.

Particulars and forms of tender may be obtained on application to the Secretary. Tenders, made out on the company's forms, should be delivered under sealed cover, endorsed "Tender for Old Materials," to the undersigned not later than 10 a.m. on Thursday, November 23, 1916.

The directors do not bind themselves to accept the highest or any tender.

T. MORRISON,
Secretary.

Secretary's Office,
Amiens Street Terminus, Dublin.
November 3, 1916.

POSITIONS VACANT.

TRAFFIC AND TICKET INSPECTOR.

Traffic and Ticket Inspector, ineligible army. Satisfactory previous experience and references. Wages 45s. United Automobile Services, Ltd., Cockton Hill, Bishop Auckland.

SMART TRAFFIC INSPECTOR.

Must be used to controlling traffic and arranging running, also ineligible for military service. State age, whether married, past experience, and enclose copy of references, with photo, to Maidstone and District Motor Services, Ltd., Maidstone.

JUNIOR SHIFT ENGINEER.

Junior Shift Engineer wanted to assist on evening shift. Commencing salary 30s. per week. Must be ineligible for military service.—Apply, stating age, experience, and copies of testimonials, to CHIEF ENGINEER, Electricity Works, Canterbury.

ELECTRICAL FITTER.

Required for South Coast Tramways an Electrical Fitter, thoroughly conversant with Tramcar Controllers and Motors, Wiring, etc. Wages 10d. per hour, with overtime at the usual increased rates. Must be ineligible for service. Write giving full particulars, to Box No. 63, THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.

THE BIRKDALE DISTRICT ELECTRIC SUPPLY CO., LTD.

SWITCHBOARD ATTENDANT.

Wanted immediately, two Switchboard Attendants; wages 25s. per week. Must be ineligible for military service. Apply, with full particulars of age, training and experience, to—

MANAGING ENGINEER.
Electricity Works, Birkdale, Southport.

RAMSBOTTOM URBAN DISTRICT COUNCIL.

FITTER.

Wanted for duration of war on the above-named Council's Railless Traction System, a competent Fitter with knowledge of Motor-bus and Tramcar Work. Applicants must be ineligible for the army or navy.

Applications to be sent to the undersigned, giving full particulars of previous employment, and stating wages required, not later than Tuesday, November 28, 1916.

JAMES WILD,
Manager.

Tramway Offices,
Stubbins Lane, Ramsbottom.

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SATURDAY, NOVEMBER 18, 1916.

LABOUR SUPPLY PERPLEXITIES.

Apart from the general action of local military representatives in claiming for the army motormen up to thirty years of age, signs are apparent of a further restriction in the supply of labour available for tramway work. Youths of eighteen are being called up for military training, and some weeks ago those of seventeen years were invited to attest voluntarily, with the liability of a call when they are a year older. To the never-ceasing demand of the Ministry of Munitions for labour the added announcement was made last week that 315,000 men workers and 100,000 women will be required if the Ministry's augmented programme is to be carried out. That steps are being taken to increase the number of national factories is shown by the statement made yesterday that the Ministry has called for the services of 40,000 men of the building trades. The imperative nature of the latest demand for munition workers is emphasized by Mr. Montagu's statement that, while he believes the nation to be anxious to respond to the call to add to the 1,850,000 men and 400,000 women now engaged on national work, steps will have to be taken to prevent the dissipation of material and labour on matters that are not essential. Probably it is the supply of boy labour that will manifest the greatest shortage. For a considerable period the high wages of munition work have taken them from ordinary avocations, and as they are the easiest class to provide for in the hostels that surround the modern munition works there may be some displacement of lads now employed by tramway companies and by a few corporations. If reliance is to be placed on the number of complaints caused by boy conductors, their work, although it frequently brings them a return of twenty shillings a week, is not so satisfactory as that of conductors of the other sex who have reached adult age. In the present state of affairs it may not be possible to attempt to render their preliminary training more effective, but when they have completed a few months' service something might be done to induce them to realise that they have a long way to go before they become efficient. It is to be hoped that the war-time introduction of boys on numerous tramways where they have never been employed before will lead managers to give consideration to a scheme for the institution of an apprenticeship system, beginning for instance with work as a bell boy, as on the Manchester cars. As to the call for more women workers in the munition factories it, remains to be seen whether it will attract women conductors on the ground that it is more patriotic work. If it is a question of remuneration there is no need to fear losses among trained workers, for the pay of women engaged on unskilled munition work is only twenty shillings per week of 48 hours, with sixpence per hour overtime up to a week of 54 hours. That there will be fewer applicants for vacancies is not unlikely. On the other hand a few men may be available on discharge from the army, but the need for a conductor to possess the full use of his limbs will restrict that limited supply. There is one source for obtaining conductors that seems to have been drawn upon in only one place so far. We refer to volunteer conductors, whose services at Newcastle have earned the thanks of the management. Provided they can serve in short shifts many middle class men beyond military age might be glad of such an opportunity for rendering service.

APPLICATIONS TO TRIBUNALS.

Newcastle Tramways Committee are appealing for 70 of their employees.

In appealing for the further exemption of eleven motormen and an inspector, Mr. W. Marsh, the general manager and engineer of the Brighton Corporation Tramways, said that there were now only 62 male employees, 214 having enlisted. This percentage of 72 was the best in the whole country. Objection to the exemptions was raised by the military representative on the ground that all the men appealed for were under 33 years of age. The public, he said, were willing to put up with a reduced service. Mr. Marsh mentioned that there was only one route suitable for the employment of women as drivers. A final two months' exemption was granted for two single motormen and the inspector, the remainder being allowed three months.

A further proof that the military authorities are intent on securing the services of the youngest motormen is afforded by the Gloucestershire Tribunal having cancelled the exemption previously granted to a motorman (28) employed by Cheltenham and District Light Railways Company. The general manager stated that the man was one of eight who could be trusted with a car on Cleeve Hill, whereupon the tribunal recommended the reduction of the service.

Bath Tribunal refused further exemption to a motor-omnibus driver, aged 29, in the employ of the local Tramways Company on the Lansdon and Bathwick route. Mr. W. E. Hardy, the manager and engineer, stated that as the man had been found fit for general service he could not oppose the claim of the military representative, who admitted that the withdrawal of the service would be a hardship. Mr. Hardy informed the tribunal that he would do his best to find a substitute, but the route required an especially skilled man. Three months' exemption was granted to a wireman, and in the cases of two fitters, passed for Class C3, Mr. Hardy was allowed to retain one on condition that he joined the V.T.C.

The Southampton Tribunal gave a final three months' exemption to the chief clerk of the Corporation Tramways, although Mr. W. T. Robson, the general manager, said that his work was of a most intricate character and required years of training. Alderman F. A. Dunsford, chairman of the Tramways Committee, was called in support of the appeal for the retention of nineteen married motormen. He stated that young and less experienced men in the darkened streets were a danger to the public, and he appealed most strongly for exemption if the Committee were to keep the service going and take the munition workers to their work. Eleven of the men, all over 35, were granted conditional exemption while in their present occupation, six were given three months' extension, with leave to apply again, and the remaining two were given till January 1 final. Of five conductors who also worked as motormen, two received conditional exemption, one three months with leave to apply again, and two till January 1 final. Permanent-way men and linesmen were given three months' exemption, with leave to apply again, and three of the former were conditionally exempted. Handymen and painters were allowed until the end of the year.

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OMNIBUSES ON RURAL ROADS.

DAMAGES AWARDED AGAINST OXFORD TRAMWAYS COMPANY.

In the King's Bench Division on November 15, Mr. Justice Sankey gave judgment in the action Abingdon Rural District Council *v.* City of Oxford Electric Tramways, Ltd., in which the council claimed £498 as expenses incurred in repairs to Foxcombe Hill Road and Wootton Road, between Oxford and Abingdon, because of damage done by the excessive weight and extraordinary traffic of defendants' motor omnibuses. Defendants denied that they had subjected the roads to excessive weight or extraordinary traffic, or had caused any damage to the roads, and they asserted that the roads had not been properly maintained and repaired. Mr. Clavell Salter, K.C., and Mr. Willoughby Williams appeared for plaintiffs; and Mr. Vesey Knox, K.C., and Mr. Eustace Hills for defendants.

Solicitors: Messrs. Church, Adams, and Prior, for Messrs. Challenor, Son, and Welch, Oxford; Mr. Sydney Morse.

'Mr. Justice Sankey, in giving judgment, said (according to *The Times* report) that the road along which defendants began to run omnibuses in 1914 left the main road from Oxford to Abingdon about two miles out of Oxford, and took a south-westerly direction to Foxcombe Hill. In the neighbourhood there was a new residential district known as Boars Hill. The omnibuses then went to Abingdon along Wootton Road. He found as a fact that the road from Foxcombe Hill to Wootton Road was a country lane, more or less, that there was hardly any traffic along it before the omnibuses came, except that of a few carts; and that the road was very narrow and tortuous. Wootton Road was a better road, but did not approach the character of a main road. His lordship next dealt with the question whether the traffic complained of was extraordinary, and he referred to Hill *v.* Thomas (9 *The Times* Law Reports, 647; [1893] 2 Q.B. 333) and Etherley Grange Coal Company *v.* Auckland District Highway Board (10 *The Times* Law Reports 62; [1894] 1 Q.B. 37), where Lord Esher said that "the ordinary traffic on the particular road must be looked to in order to see whether the traffic is extraordinary, and that it is none the less extraordinary with regard to that road because it would be ordinary traffic on another road." The last case on the subject was Barnsley British Co-operative Society *v.* Worsborough Urban Council (32 *The Times* Law Reports, 41; [1916] 1 A.C., 291). In that case Lord Loreburn said: "I can understand cases in which it might be properly thought that it was extraordinary by reason of the purpose, or the occasion; or the quality, or the quantity, or the method of use." Whether particular traffic was extraordinary traffic must be a question of fact in each case. Counsel for defendants said that this was the first case in which it had been sought to make the owners of motor omnibuses liable for extraordinary expenses on the ground that such traffic was extraordinary traffic. His lordship thought that statement did not advance the solution of the problem, which depended on the circumstances in which the omnibuses ran over the road. On some roads, like the Strand, omnibuses were not extraordinary traffic; on other roads one was just as likely to meet a mastodon as a motor omnibus, and in such case it could not be said that the running of a motor omnibus was ordinary traffic. The defendants' omnibuses were much heavier than any of the traffic on the roads in question before the advent of the motor omnibuses, and a census of the traffic from September 28 to October 4, 1915, showed the vast preponderance of the omnibuses over any other motor traffic of comparable weight along the roads, there being 135 omnibuses, against 11 covered motor vans, 8 motor lorries, and 2 traction engines with trailers. Counsel for defendants said that the question was whether a service of omnibuses run to serve the needs of a district could be extraordinary traffic. His lordship was unable to see how the demand of a district for traffic which was extraordinary could turn that traffic into ordinary traffic, although the traffic might be necessary traffic, and might in the future become ordinary traffic. The only thing, however, which he had to consider was the present traffic over the roads as they were at the present time. He came to the conclusion that the traffic in question was extraordinary traffic, and that the roads had been properly kept up and that plaintiffs had incurred extraordinary expenses to the amount of £350 in repairing the roads. Defendants, however, said that their liability was limited by section 12 of the Locomotive Act, 1898, to expenses incurred within 12 months from the beginnng of the action on July 20, 1915, whereas plaintiffs were claiming for expenses incurred from March 31, 1914. Further, plaintiffs said that some of the damage was due to the cartage of sand over the roads. Taking those facts into consideration, his lordship thought that plaintiffs were entitled to £350, and he gave judgment for that amount.

ROADMAKERS FOR WORK IN FRANCE.

Mr. H. P. Maybury, engineer and manager to the Road Board, who has been on a visit to France with Sir Eric Geddes, Inspector-General of Transportation to the British Expeditionary Force, is raising a special battalion for dealing with the construction and maintenance of roads in France within the British area. The men will not be armed, and service will be for the duration of the war. The companies will be officered by road surveyors or public works engineers, the non-commissioned officers being chosen from foremen. Men over military age and up to 52 years are required, and they will be paid 3s. a day, with clothing, rations and such allowances as are paid to private soldiers who have wives and children. Mr. Maybury is receiving the co-operation of a number of surveyors, and the project has been brought to the attention of local authorities, who are informed that officers, men and plant are urgently required. In Surrey, Mr. A. Dryland, the county surveyor, is seeking to raise two companies. The matter was brought to the notice of York City Council on November 13, when the Corporation agreed that the Streets and Buildings Committee should give every possible help in the matter.

SPARE PLANT IN GENERATING STATIONS.

The unfortunate experience of the Birmingham Corporation Tramways department in having to curtail the service for a considerable period, owing to the inability of the electricity undertaking to supply sufficient energy, has an interest for other tramway authorities who are dependent upon one station for the two departments. In consequence of the increased demand due to war work that has arisen in most towns, and the difficulty of obtaining extra plant during the present crisis, the question of the amount of spare plant available has become one of great importance. The position of some of the leading municipalities and companies is indicated in the appended table:—

	Maximum demand.	Plant capacity, kw.	Spares, kw.	Percentage of spares.
Glasgow	50,000	54,550	4,550	9%
Birmingham ..	33,000	41,505	8,500	25%
Edinburgh	11,400	20,390	8,990	80%
Dundee	7,014	16,500	9,486	120%
Leeds	16,700	26,600	9,900	60%
Liverpool	23,511	44,600	21,089	90%
Manchester ..	49,897	57,300	7,403	17%
Sheffield	23,618	26,000	2,382	10%
Companies.				
Charing Cross ..	12,664	26,480	13,816	100%
Central	10,443	19,695	9,252	90%
Chelsea	19,739	30,000	10,261	50%
City of London ..	13,700	20,300	6,600	50%

The above figures were included in a report presented to the Glasgow Electricity Committee by Mr. Lackie, their electrical engineer, in connection with a recommendation that an extension of the plant should be carried out. The committee decided to proceed with the fourth part of the Dalmarnock scheme, representing an addition of about 40,000 h.p. of plant. It should be noted that Glasgow is one of eighteen places that have separate stations for the tramways and electric supply departments.

CRITICAL OUTLOOK AT BELFAST.

Belfast Corporation on November 3 authorised the Tramways and Electricity Committee to take up the matter of extending the electricity works and to submit a complete scheme, part of which could be put in hand as soon as the Treasury sanction the expenditure. This decision was arrived at in consequence of Mr. T. W. Bloxam, the city electrical engineer, having reported that the lighting, power, and tramways demand during the coming winter, when the whole of the 13,300 kw. plant installed is running simultaneously at its full normal rating, would leave a margin of about 11 per cent., distributed over the three systems. He considered that the margin should be at least 25 per cent. The largest generators had a capacity of 1,500 kw., so that the margin disappeared if one of these required to be laid off during the evening load. Conditions favourable to allow of getting full normal rating from every engine simultaneously seldom obtained in central stations. These circumstances led him to anticipate a shortage of energy during November or December of this year, and a more pronounced shortage next year, as he saw very little possibility of increasing the plant by then. The effect of this shortage would be a diminished brilliancy of the lighting, motors giving less power, and tramcars slowing down between the hours of 4 and 5.30 p.m., unless the shortage was sufficiently serious to stop the cars altogether. The Corporation also approved of a circular being sent to users of electricity, thanking them for the manner in which they had met the committee last year in reducing their demands between the hours of 4 o'clock and 5.30 in the afternoons of November and December, and asking them to make a similar reduction this year.

Owing to the breaking of a conveyor belt the Birmingham Tramway service was at a standstill for three hours on November 10, from 9.30 a.m. to 12.30 p.m. Notice had previously been given to the public that for some weeks the service is liable to be suspended daily between 9.30 a.m. and 12 a.m., and 2.30 p.m. and 5.45 p.m., with the exception of Saturday and Sunday.

Sheffield Electric Supply Committee recommend that Sir Alexander Kennedy be asked to advise on a proposal for a new generating station. As the result of the continuously increasing demands for energy for the tramways, the committee have resolved to acquire land in the east district and to erect thereon a sub-station. Contracts will be placed for two rotary converters, switchgear, cables, etc., the total cost (including the buildings) being estimated at £8,000. The Corporation have adopted the foregoing proposals.

Cable Car Accidents.—The remarkable immunity from accidents involving personal injuries that characterises the Edinburgh cable tramways was broken three times on November 9 and 11. On the first-mentioned date a car, proceeding eastwards along London Road, had reached the point where the cable is released and the vehicle makes its return journey from the end of Norton Place. Passengers had risen to leave the car, when suddenly it gathered speed and dashed along the rails leading on to the Portobello route. Here it ran into a Joppa car, which was stationary, with the result that occupants of both vehicles suffered badly. Sixteen persons received attention from doctors, two being taken to the infirmary. Two mishaps occurred on the second date. In one case a car, driven by a learner (accompanied by an inspector) struck the metal pawl under the cable slot at the east end of Princes Street, owing to the gripper not having been raised beyond the reach of the block. Six persons sustained cuts, shocks or a shaking. The other accident was a collision between two cars at Pilrig terminus, when three persons were slightly injured.

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MISCELLANEOUS NEWS AND NOTES.

Halifax (Nova Scotia) Tramway Company intend to reconstruct their lines and to replace a large part of the equipment at a cost of about £300,000.

New Depot at Sheffield.—The Tramways and Motors Committee have agreed to erect a new depot at the corner of Pickmere and Fitzgerald Roads.

Christmas Day Holiday.—There will be no car service in Northampton on Christmas Day. The Corporation Tramways Committee discontinued the running on that day many years ago.

Refusal to License Women as Drivers.—Carlisle Corporation have approved of the refusal of the Watch Committee to license women to act as drivers of the Tramway Company's cars.

Tramways and Light Railways Association.—The journal of the Association for November contains the Order of October 9 as to lights on vehicles in places outside the Metropolitan and City of London police districts.

Motor Vehicles for Municipal Work.—The chairman of the Works Committee of the Brighton Corporation and the borough surveyor have been authorised to make inspection of motor vehicles in use in other towns for street cleaning and refuse removal.

Women Drivers for Paris Tramcars.—Sanction has been given to the employment of women as drivers of tramcars in Paris, but the police will decide as to which sections they are to work upon. It is not proposed that the "wattwomen," as the newspapers term them, should be placed on cars that pass through crowded thoroughfares.

Steel Tires for Tramcars.—The arrangement made by the Tramways and Light Railways Association with the manufacturers of steel tires in November, 1915, is to be continued for the quarter ending January 1, 1917, so that prices will remain the same as hitherto. A permit from the Ministry of Munitions (Priority Branch B.M. 3) is now required with each order.

Volunteer Motormen for Huddersfield.—Mr. R. H. Wilkinson, general manager of the Corporation Tramways, has obtained the sanction of the committee to train a number of men above military age to act as motormen early in the morning and evening. The men will be paid for their services. This step has become necessary owing to the number of motormen having been called up for military service.

L. & S.W. Suburban Electrification.—The electrification of the Claygate section of the London and South Western Railway Company's suburban lines has been completed, and a half-hourly service of electric trains between Claygate and Waterloo, covering the journey in 29 minutes, will begin next Monday. Rail motors will run every half-hour in connection with the electric service between Claygate and Guildford. The electric service from Waterloo to Hampton Court will now comprise four trains an hour.

Tramway Traffic During Air Raids.—Ilford Urban Council have adopted a report by the Tramways Committee relative to the running of the cars during an air raid or when warning is given of a possible raid. The service will be continued at a reduced speed and in accordance with the regulations approved by the military authorities, who attach great importance to the point that the service should not be stopped. On the London County Council Tramways the warning will be given by means of a green light on the feeder pillars.

Restriction of Services.—Southampton Tramways Committee have accepted the recommendation of the manager that the services should cease from an hour to an hour and a half earlier in the evening. It is probable, however, that the change will be deferred until after the Christmas holidays. Sunderland Council have agreed to the Tramways Committee's recommendation that the last cars shall start at 10.30 p.m. instead of 11.30. At Lincoln the Corporation rejected the Tramways Committee's proposal to cease running at 9 p.m. instead of ten o'clock. Alderman W. S. White, chairman of the committee, opposed the recommendation.

Glasgow Women Conductors' Wages.—Glasgow Corporation recently received a deputation from the United Suffragists, who urged that the women car conductors should be paid the same rate of wages and war bonus as the men. While the latter start at 29*s.* and also receive a bonus of 2*s.*, the women's pay is 27*s.* for six months (after which period 1*s.* is added) and a bonus of 1*s.* After considering a memorandum by the town clerk, the Tramways Committee have recommended that women employees in the department work under the same terms and conditions and be paid on the same scale of wages as the men.

Plated Pennies.—Alluding to the report that plated pennies have been passed on Edinburgh tramcar conductors, Mr. J. F. Cameron, general manager, Northampton Corporation Tramways, writes: "We have suffered by the passing of bad money in the dark on the top deck of a car, one girl conductor having had two bad half-crowns passed on her during one week. It hardly seems possible that certain members of the travelling public would play such a trick upon a conductor who is struggling in the semi-darkness to get her work done. It may be possible that the tenderer of the coin was unaware of its baseness, but this seems hard to believe." It is advisable to instruct conductors to examine coins under a lamp in order to avoid instances such as those at Edinburgh, but base metal can only be detected by the use of a tester. These little appliances are to be seen on the cars in some towns.

Motor-car Emancipation Anniversary.—November 14 was the twentieth anniversary of the freeing of motor-cars from the traction engine regulation requiring a man with a red flag to precede them. The occasion was celebrated by a run from London to Brighton, which served to reveal the imperfections of many of the cars of that date. But in its report of the day's proceedings, THE TRAMWAY AND RAILWAY WORLD said that the new industry was bound "to prove of great benefit and to flourish exceedingly;" indeed, it anticipated that the new development would give "a prodigious impulse to transport both by road and rail," a prediction that has already been largely realised.

The Letter of the Law.—A motor invalid chair in which the motor is embodied in the steering-wheel has long been used in America. Some British makers have unsuccessfully endeavoured to obtain an opinion from authorities as to whether the vehicle is a motor-car within the meaning of the motor car Acts. When the car was used at Hampstead the police instituted prosecutions for using an unregistered car and driving without a licence. The magistrates imposed a fine of 10*s.* on each count, but dismissed a childish summons against another person for "aiding and abetting" in both offences.

Carriage of Track Materials in a Trailer.—An inquest was held on November 11 at Treorky into the death of a woman who died from injuries received by falling from a tramcar when the conductor gave the signal to start. The deceased fell under a trailer attached to the rear of the vehicle laden with cement. Mr. G. E. Roddy, traffic manager, Rhondda Tramways Company, admitted that the trailer should not have been attached to a vehicle carrying passengers. That method of conveying material to places to repair the track was adopted owing to shortage of labour and the difficulty of obtaining horses and carts. The repairs were very badly needed, and great pressure had been brought to bear by the district council and several local bodies to put the track into better order. In returning a verdict of accidental death, the jury added a rider (1) that they condemned the overcrowding of passengers on the platform of cars; (2) the attaching of trailers to passenger cars; and (3) recommended that notices should be posted up announcing when cars were full.

Traffic Impeded by Fog.—From an early hour on Monday evening until past midnight the Metropolitan area was enshrouded in a fog more dense than has been experienced for a number of years. Railway and omnibus traffic was delayed, and in open spaces omnibuses and cabs had to be guided by policemen with lamps, or else by conductors of the former, for as soon as the vehicles were out of sight of the kerb the drivers lost their course. On tramway routes the rails, under the reflection of the headlights of motor vehicles, proved a guide to the latter, while tramcars accomplished their journeys with a little delay. For instance, a run that under normal conditions takes forty minutes required an extra twenty minutes. To achieve this result the motormen had to bring into use the banned headlight, throwing open the glass flap and in some cases freeing the lamp glass of the discolouring matter. On the Embankment motor-cabs made their way only by running on the tramway route. Underground railways had a great accession of traffic. The crossing of the bridges was a difficult task for omnibuses, which were provided with an extra man on the front seat with an electric torch. In North London the omnibuses had to stop, and long lines of them were drawn up. Bristol also experienced a fog, which caused some of the omnibus services to be suspended.

Struck by a Trolley Pole.—At an inquest on the body of a commercial traveller held at West Ham on November 7, evidence was given by the motorman and conductor of a Metropolitan Tramway Company's car that on October 11 the vehicle was proceeding along Green Lanes to Enfield, when they noticed the wires shake. On going to the top deck, they found the trolley pole had fallen and was lying under the hook with which it was fastened when not in use. Deceased had sustained a slight cut on the head, and he was seen by a doctor. Dr. Barrs, deceased's medical attendant, who was called to his house, said the wound was slight, but his condition was pitiable, as he had had a severe blow on the head. He died from urenal coma and heart failure. The accident probably influenced the action of the kidneys. Dr. Coutts, who made the post-mortem examination, said there was no evidence that the injury reacted on the kidneys, but that would not necessarily mean that the accident did not influence the kidneys. The disease of the kidneys was of some months' duration, and would have produced death in a natural way. The jury found that death was accelerated by a wound on the head, but that how it was caused the evidence had not disclosed. Mr. Godfrey represented the Tramway Company.

Another Window Guard Action Fails.—A short time ago we reported the failure of an action against a tramway company, in which a passenger sought damages for an injury sustained owing to a guard rail on a window facing the platform coming away in his hand while he was waiting to alight. Plaintiff lost the action through having taken hold of the window rail instead of the grab rail lower down the side of the car. At Liverpool Assizes on November 2, Mr. J. H. Ellison claimed damages for injuries alleged to have been caused by being jerked off his feet on a tramcar platform and thrown into the street. Plaintiff stated that he supported himself on the platform of a Liverpool car by taking hold of one of the window-guard rails, which was more convenient to his grasp than the handrail. The rail came away in his hand and he was thrown on to the platform, injuring his right elbow. He got up and was jerked into the road, his right thigh being wrenched. For the Corporation it was contended that when plaintiff found he had passed his station he tried to get off the car, and in doing so took hold of the window-rail, which was not intended for that purpose. The conductor denied that plaintiff fell on the platform or that he was thrown on to the road. Mr. Justice Avory instructed the jury that a man who was alighting from a car was not entitled to catch hold of anything not intended for his use, and then if it gave way to sue the Corporation. The jury found for the defendants, for whom judgment was entered.

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L.C.C. Employees' Wages—At the meeting of the London County Council on Tuesday the only tramway reports submitted by the Highways Committee had reference to applications for increases in pay. The Rolling Stock Conciliation Board have increased the pay of men graded as tool makers and engaged on munition gauge work from 11*d.* to 1*s.* 2*d.* an hour. When the men cease to be employed on this work they are to revert to the rate of from 10½*d.* to 11*d.* an hour. Fitters and turners engaged on munition gauge work are to be paid 10½*d.* an hour while so employed. War wages of 4*s.* a week are to be paid to car examiners, car washers and advertising labourers as from August 3, 1916. The cost of giving effect to the agreement is estimated at £2,000 for the remainder of the financial year, and £3,050 in 1917-18. On the application by employees in the traffic section of the tramways that their wages should be increased by 15 per cent., the Traffic Conciliation Board failed to arrive at an agreement, except so far as printing shop employees are concerned. The remainder of the application will be submitted to arbitration. Applications from coach body makers and wheelwrights for an increase of 6*s.* a week, from engineering employees for an increase of 2*d.* an hour, from moulders for 3*s.* a week, from millwrights and electricians for 2½*d.* an hour, and from patrol and gate constables for 1*d.* an hour war bonus were referred to the conciliation boards. Women employed at the central car repair depot applied for an increase of 6*s.* a week war wages. It had been decided that the wages of women over 21 years of age should be increased by ½*d.* an hour (2*s.* a week), but they declined to accept this as a settlement, and ask that the application should be referred to the conciliation board. The Highways Committee, while continuing the increase of ½*d.* an hour already granted, recommended a reference to the conciliation board of the question of any further advance. The latter course was also recommended on an application from employees in the building section of the tramways for an increase of 1*d.* an hour. All the recommendations were adopted.

PERSONAL.

Mr. J. S. Pitkeathley, C.V.O., electrical engineer, Imperial Works, Delhi, has been gazetted as temporary major.

Mr. H. J. Hawkins, formerly electrical engineer to Salford Corporation, has been appointed chief engineer to a London firm at Karachi.

Sir William Clegg has again been re-elected chairman of Sheffield Tramways Committee, an office which he has held for many years. The vice-chairman is Alderman Fenton.

Sergeant A. E. Irving, a Burnley Corporation tramway employee, who has been wounded, has won the D.C.M., and was also awarded the decoration of the third class of the Order of St. George of Russia.

Mr. John Christopher Mitchell (treasurer of the Underground Electric Railways Co. of London (Ltd.), and Allied Companies), has been elected president of the Chartered Institute of Secretaries for the ensuing year.

Alderman R. A. Smithson, chairman of Leeds Tramways Committee, at the election of Mr. E. Arnold as Lord Mayor of Leeds, presented to the ex-Lord Mayor and Lady Mayoress, on behalf of the members of the Council and chief officials, a handsome spirit kettle, the gift taking the place of the dinner to which in peace time it is customary to entertain the outgoing Chief Magistrate.

Councillor Max Muspratt, the new Lord Mayor of Liverpool, is a member of the Tramways and Electricity Committee, and Councillor Harrison Jones, in proposing his election, remarked that his special knowledge had been of great service to that committee. Sir Charles Petrie, a former chairman of the committee, seconded the motion, which was supported by Alderman Harford, leader of the Irish party, who referred to Mr. Muspratt as a great chemist.

CONTRACTS AND ORDERS.

Sheffield Tramways Committee have accepted the tender of Dawson and Jones, Ltd., for alterations and additions at the Townend tramway depot, at £3,619, in order to fit it for an omnibus garage.

FINANCIAL REPORTS AND MEETINGS.

Southend Tramways and Electric Lighting.—The past year's trading of the light railway undertaking shows a profit of £3,300, while the electric lighting department made a profit of £6,000.

Edison Swan Electric Company.—The net profits for the year ended June 30 total £24,146, and £4,879 was brought forward. It is proposed to transfer to the reserve £25,000, and carry forward £4,025. No dividend is recommended, in order that capital may be available for the extension of the business.

Dennis Brothers, Limited.—The directors of Dennis Brothers Limited, motor vehicle works, Guildford, recommend a final dividend of 1*s.*, and a bonus of 1*s.* per share, making 3*s.* per share (15 per cent.) for the past year. The distribution for 1914-15 was similar to that proposed for the past twelve months, and 10 per cent. was paid for the preceding year.

Stirling and Bridge of Allan Tramways Company.—The report for the year ended August 31 states that the earnings amounted to £4,909, an increase of £26. The expenditure under revenue has been £5,106, an increase of £591, and of £1,179 for the past two years. This is due to the increase in all working expenses and particularly in the cost of provender and litter. The year's working resulted in a loss of £197.

Newport Tramways and Electricity Undertakings—The Borough treasurer of Newport has reported a profit on the year's working of the tramways undertaking of £5,419 and a loss on the electricity undertaking of £983. The two years' war bonus has been charged on the latter undertaking for this year, or otherwise there would have been a gratifying profit.

Provincial Tramways Company, Ltd.—In the annual report of this company, of which Mr. J. Barber Glennis the managing director, it is recommended that from the balance of £27,376 remaining on the year's trading, a dividend be paid on the £1 ordinary shares of 10*d.* per share, and a bonus of 6*d.*, equal to 1*s.* 4*d.* per share. With 8*d.* per share paid in June last, these shares receive a dividend of 2*s.*, equal to 10 per cent. for the year.

L.C.C. Tramway Receipts.—The traffic receipts for the two weeks ended November 1, 1916, were £94,498, an increase of £6,423, as compared with the corresponding period last year. The number of passengers was 22,073,202, an increase of 1,820,067. From April 1 to November 1 (thirty and a half weeks) the total receipts were £1,502,748, an increase of £147,331 on the corresponding period of 1915. The route mileage was 141.67.

Oldham Corporation Tramways. By a transposition of some figures in the list of Tramway and Omnibus Traffic Returns in our last issue, the return for the Oldham Corporation Tramway was incorrectly given. The returns for the week ended November 5 showed that there had been an increase of £198 3*s.* 11*d.*, while for the 32 weeks the aggregate increase was £4,625 6*s.* 5*d.* As shown in the traffic returns in this week's issue, the traffics for the week ended November 12 give an increase of £171 5*s.* 3*d.*, making the total increase for 33 weeks £4,796 11*s.* 8*d.*, an excellent record.

Ayr Corporation Tramways.—The annual report prepared by the general manager, Mr. W. Grant, shows that the revenue totalled £19,285, an increase of £1,300. The number of passengers was 4,352,113, an increase of 332,342. The working expenses, including power costs, amounted to £11,828, or 6.20*d.* per car mile. There has been increased expenditure resulting from allowances to dependants of employees on active service, war bonuses and higher charges for electrical energy. The result of the year's working is a deficit of £16, which was paid out of the reserve fund. The reserve fund stands at £4,632, and depreciation and renewals fund at £14,571. The total number of employees who have joined the various branches of His Majesty's Forces is 52, being 7·0 per cent. of the staff.

Dunlop Solid Tires.—At a meeting of the shareholders of the Dunlop Rubber Company on November 7, the shareholders approved of a resolution to increase the company's capital to £3,000,000 by the issue of £1,000,000. Sir Arthur Cros, who presided, and moved the resolution, stated that the money was required to increase the company's stocks of raw materials and manufactured goods to the value of about £750,000, also to provide additional capital to finance the manufacture and sale of solid motor tires. In the United States the demand for solid tires had doubled within two years, and had reached a total of 1½ million tires. In Europe there were more solid tire transport vehicles in use than in the United States, and the enormous number of vehicles brought into commission would exist after the war, and would be used to supplement railways and would be invaluable in countries not fully developed. The Dunlop Company's output of solid tires had increased 4½ times in four years, and when their new mill was completed they would be able to increase their trade by 15 times. He might mention that in one year alone, taking the returns from leading users, such as the London General Omnibus Company and so forth, the average increase in the efficiency of the company's solid tires had been 45 per cent. That increase in efficiency was the result of ceaseless watchfulness in their laboratories, where last year, even with their greatly depleted staff, they had carried out 73,000 distinct and separate tests all tending to improve the efficiency of their output. German competition had been eliminated, but that had been replaced by American competition. The Government, with a view of restricting the import of goods which could be produced in this country, and so avoiding the export of gold, first imposed heavy import duties; later they abandoned that method in favour of total prohibition, but in connection with rubber goods the prohibition had been withdrawn. He considered the object of the Government in that withdrawal could have been achieved without sacrificing the interests of the industry. Their business in France had completely recovered itself, and stood higher than ever before.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-four of the principal tramway undertakings in the United Kingdom for the week ended November 4 give total receipts of £182,035, or £13,994 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or sixty-six more than for the corresponding week. The receipts this year were at the rate of £81 12*s.* 7*d.* per mile of single track, and last year at the rate of £77 13*s.* 9*d.*, thus showing an increase for the week of £3 18*s.* 10*d.* per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET, LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Last.	Name.	Paid.	Price, July 27 1914	Cash. Nov. 16	A Week Ago.
5%	5%	Alabama Traction. 5% 1st. Mt.	—	67	75½	74½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4¼	65/-	65/-
4%	4%	Do. 4% Deb. ...	100	91	68½	69
4½%	4½%	Do. 4½% Deb. ...	100	98½	74½	74½
5%	5%	Do. 5% Deb. ...	100	96	68½	69
1/-	7d	Auckland Elec. Trams. Ord. ...	1	1⅝	21/-*xd*	21/-
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	94½	94½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11½	10⅛	10⅛
4½%	4½%	Do. 4½% Deb....	100	96	83	83
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	91½	91½
$1	$1	Brazilian Trac. & Power Ord. ...	$100	66	53½	54½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	92½	92
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6¾*xd*	6¾
2/6	2/6	Do. 5% Cum. Pref.	5	5	85/-	85/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	58⅞	58⅞
6%	5%	Do. Pref. Ord....	100	106	56½	56½
5%	5%	Do. 5% Cum. Pref.	100	103	68½	70
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	88⅜	88⅜
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	61	66
—	£3*	Brit. Elec. Trac. Ord.	100	—	35	35½
—	6%	Do. 6% Cum. Part Pref. ...	100	—	77	76½
5%	5%	Do. 5% Deb.	100	92	82½	82½
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	69⅜	69⅜*xd*
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	81½	81½
3/-	6/6	Calcutta Tramways, Ord. ...	5	7⅜	6⅛	6⅛*xd*
1/3	1/3	City of B.A. Trams.	5	5⅜	84/4½	86/3
5/-	4/-	Dublin United Trys 6% Pref.	10	12	10⅜	11
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79⅜	79⅜
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	27/6	27/6
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅜	2/1⅛	2/1⅛
6/-	6/6	Lanarkshire Trys. Co.	10	10½	9⅝⅝	9⅝⅝
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9⅜d.	9⅜d.*	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	1⅝	2/3	1/6
6d.	6d.	Do. 5% Pref.	1	1⅝	7/6	7/6
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	64½	64½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88	88
5%	5%	Do. 5% Inc. Deb.	100	88½	79½	79½
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	47½	47½
3/-	3/-	Madras Elec. 6% Pref. ...	5	5⅛	96/6	96/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	66½	66½
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	68	68
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	74½	75½
$1½	$1½	Mexico Trams. Common ...	$100	70	27	31½
5%	5%	Do. 1 Mt. 5% G.B.	—	8¼	43½	43½
6%	6%	Do. 6% Mt. Bds.	100	76	30	30
4½%	4½%	Montreal St.4½%Stg.Debs.(1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95	95
1/-*	1/2½*	National Steam Car	1	⅛	18/9	19/6
9⅜d.*	9⅜d.*	New General Traction	1	⅜	7/9½	7/9½
8½d.	6d.	Northern Gen. Trans. Ord. ...	1	⅝	15/4½	15/4½
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	68/9	70/-
5%	5%	Do. 5% 1st Deb.	100	89½	74½*xd*	74½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80⅜	80⅜
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	⅛	10/9	10/-
10d.	8d.	Provincial Trams. Ord.	1	⅜	17/-	17/-
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84/-	84/-
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	91⅝	91½
5%	5%	1st. Mt. 5% 50 yr.	100	89½	75½	75½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	90½	90
5%	5%	Do. 5% Perp. Deb.	100	99½	77½	77½
—	—	Singapore Elec. Trams	5/-	½	4/10½	4/10½*xd*
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	96½	96½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	81	81
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	97⅜	98
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	77	77
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	9/3	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4½	95/-	99/6
—	—	Metropolitan Dist. Ord. ...	100	21⅝	15½	14½
—	—	Undgd. Elec. Rys. of London ...	10	2½	39/4½	33/9
		Do. "A"	1/-	⅜	7/1½	6/-
4½	4½	Do. 4½% Bds of 1933 Rd.	—	99	102	101⅜
6	6	Do. 6% 1st Cum. In. Db.	100	114	101½	101½
6	6	Do. 6% In. Bonds Rd. ...	—	88	90½	89½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1915	1916	Aggregate. Wks.	1916	Increase or Dec.
Anglo-Argentine	Nov.11	£53,091	£52,460	46	£2,296,123	+ £2,739
Auckland.....(28 days)	Oct. 20	20,831	21,428	16	84,286	+ 1,160
Ballarat and Bendigo ...	Sept. 10	3,075	2,850	24	18,720	+ 611
Brazilian Traction Mlrs.	Sept.	6,494,000	6,920,000	39	61,249,000	+3,791,890
Brisbane	Oct.	31,880	32,760	44	330,420	+ 23,466
British Columbia.....$	Sept.	517,022	540,440	13	1,629,026	+ 94,155
Buenos Aires Lacroze ...	Oct. 4	42,516	39,670	17	151,615	+ 13,184
Burmah Tramway ... Rs.	Sept.	22,163	23,749	9	48,161	— 839
Calcutta.....Rs.	Nov. 11	60,812	70,189	46	3,059,220	+ 156,333
Cape Town	Oct.	...	14,238	...	...	...
Carthagena & Herrerias..	Oct.	2,169	2,539	44	25,139	+ 7,390
Cordoba	Sept.	13,210	13,380	26	84,554	+ 648
Costa Rica	July	3,046	3,223	...	...	...
East India	Oct.	2,069	2,080	13	7,125	+ 736
Hong Kong .....$	Oct. 7	12,289	14,443	43	583,912	+ 142,590
Kalgoorlie	Aug.	3,165	3,021	35	20,479	— 1,640
La Plata	Oct.	4,405	4,433	44	42,057	— 227
Lima	Sept.	30,530	33,348	39	304,058	+ 15,777
Lisbon .....Escu.	Sept.	...	194,276	...	...	...
Madras .....(2 weeks)	Oct. 31	31,293	31,819	43	633,910	+ 45,027
Manila	July	23,750	33,700	31	887,739	+ 39,986
Manaos .....Rs.	Aug.	...	147,774	...	...	...
Melbourne.....	May	...	69,275	...	...	...
Montevideo.....	Sept.	25,070	26,711	48	819,643	+ 15,626
Pernambuco	Nov. 12	3,189	3,504	45*	137,492	— 1,290
Peruvian .....$	Oct.	806,900	945,590	18	3,588,830	+ 482,773
Port Elizabeth	Oct.	...	3,131	...	...	...
Rangoon	Oct.	4,886	5,043	44	46,371	— 1,844
Shanghai .....$	Oct. 11	28,082	33,605	...	...	...
Singapore .....$	Sept. 30	11,524	12,989	39	490,501	+ 51,323
Toronto.....$	Sept.	804,902	913,535	39	8,003,764	+ 855,159
Winnipeg	Sept.	261,982	267,497	39	2 461,454	— 51,995

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	1916	Incr. or Dec.	Aggregate. Wks.	1916	Incr. or Dec.
Aberdare U.D.C.	Nov. 7	£346	£426	+ 80	32	£12,705	+ £1,470
Aberdeen Corporation...	,, 8	1,861	1,958	+ 97	23	45,088	+ 2,474
Accrington Corp.....	,, 1	511	540	+ 29	31	18,273	+ 699
Ayr Corporation	,, 11	251	271	+ 20	26	12,449	+ 1,074
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.....	,, 12	1,362	1,546	+ 184	32½	50,448	+ 5,224
Birmingham Corp.	,, 11	15,355	14,462	— 893	32	524,832	+ 64,992
Do. Motor Omnibuses	,, 11	804	1,044	+ 240	32	32,370	+ 4,328
Blackburn Corp.	,, 8	1,080	1,109	+ 29	32⅜	41,960	— 1,061
Blackpool & Fleetwood.	,, 11	291	345	+ 54	45	41,829	+ 4,817
Blackpool Corp.	*	...	...	...	...	...	...
Bolton Corporation.....	,, 12	2,583	2,853	+ 270	33	95,619	+ 6,821
Bournemouth Corp.....	,, 15	1,733	2,082	+ 349	33	79,423	+ 6,176
Bradford Corporation ...	,, 11	6,020	6,223	+ 203	32	223,552	+ 7,832
Brighton Corporation ...	,, 12	918	1,127	+ 209	32⅞	43,372	+ 4,634
Bristol	,, 10	9,718	10,124	+ 406	45	455,882	+ 23,943
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	,, 11	1,488	1,574	+ 86	33	57,000	+ 3,274
Burton-on-Trent Corp...	,, 12	281	272	— 9	32	9,063	— 497
Bury Corporation.....	,, 5	1,252	1,343	+ 91	32⅜	46,355	+ 2,175
Cardiff Corporation.....	Oct. 21	2,540	2,993	+ 453	29	89,500	+ 8,031
Chatham & District.....	Nov. 9	1,070	1,179	+ 109	45	55,822	+ 2,900
Chesterfield Corp.	,, 9	260	256	— 4	32	9,093	+ 292
Colne Corporation	,, 11	234	245	+ 11	...	...	...
Cork Electric	,, 9	473	493	+ 20	45	23,120	+ 347
Croydon Corporation ...	*	...	...	...	...	...	...
Derby Corporation	,, 11	1,055	1,134	+ 79	32½	37,436	+ 2,797
Dover Corporation	*	...	...	...	...	...	...
Dublin & Lucan	,, 10	115	126	+ 11	19	3,326	+ 254
Dublin United	,, 10	5,880	6,040	+ 160	45	274,583	— 347
Dundee City	,, 8	1,388	1,363	— 25	25⅜	35,900	+ 780
East Ham Corporation	,, 11	1,222	1,222	nil	31½	42,903	+ 284
Exeter Corporation.....	,, 10	347	389	+ 42	32	13,301	+ 591
Glasgow Corporation	,, 11	21,795	23,694	+ 1,899	23⅜	552,990	+ 39,994
Glasgow Subway.....	,, 11	1,192	1,220	+ 28	45	51,652	+ 4,387
Glossop (U. Elec. Supp.)	,, 11	124	139	+ 15	46	6,420	+ 639
Halifax Corporation.....	,, 7	2,033	2,021	— 12	31⅛	73,301	+ 944
Do. Motor Omnibuses	,, 7	42	49	+ 7	31⅛	1,604	— 32
Hastings & District.....	,, 10	790	829	+ 39	45	47,759	+ 3,056
Huddersfield Corp.	,, 11	2,512	2,667	+ 155	32	93,059	+ 8,102
Hull Corporation	,, 11	3,104	3,244	+ 140	33	101,226	+ 1,824
Ilford U.D.C.	,, 11	585	640	+ 55	32	22,455	+ 1,238
Ilkeston Corporation ...	*	...	...	...	...	...	...
Ipswich Corporation	,, 11	480	419	— 61	32	17,339	— 1,008
Isle of Thanet	,, 11	248	279	+ 31	6	1,790	— 27
Kilmarnock Corp.	,, 11	156	172	+ 16	25⅜	4,594	+ 110
Lanarkshire	,, 9	2,019	2,267	+ 248	45	104,495	+ 15 008
Lancashire United	,, 8	1,596	1,815	+ 219	45	82,888	+ 4,450
Leeds City.....	,, 11	8,745	9,417	+ 669	33	321,130	+ 29,170
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	,, 11	728	846	+ 118	25⅜	23,063	+ 2,803
Leyton U.D.C.....	,, 9	1,471	1,503	+ 32	32	54,434	+ 1,074
Liverpool Corporation...	,, 11	13,052	14,230	+ 1,178	45½	638,598	+ 35,057
Llandudno & Colwyn B.	,, 10	190	221	+ 31	49½	18,198	+ 1,167
London County Council	,, 1	43,741	47,482	+ 3,741	30⅛	1,502,748	+ 147,331
London Genl. Omnibus	*	...	...	...	...	...	...
London United.....	*	...	...	...	...	...	...
Lowestoft Corporation...	*	...	...	...	...	...	...
Maidstone Corporation..	,, 9	190	197	+ 7	32	7,235	— 123
Manchester Corp.....	,, 11	17,455	18,514	+ 1,059	31	614,038	+ 33,157
Met. Elec. Trys.	*	...	...	...	...	...	...
National Steam Car.....	*	...	...	...	...	...	...
Nelson Corporation	,, 11	187	185	— 2	32½	6,993	+ 538
N'castle-on-Tyne Corp.	,, 11	5,799	6,918	+ 1,119	32	217,396	+ 11,796
Newport (Mon.) Corp....	,, 11	814	959	+ 145	32	31,252	+ 3,619
New St. Helens & Dist.	,, 8	901	1,049	+ 148	19	22,447	+ 1,698
Northampton Corp.....	,, 10	664	739	+ 75	32	23,152	— 991
Nottingham Corp.....	,, 9	3,635	3,904	+ 269	32	127,272	+ 5,731
Oldham Corporation ...	,, 12	2,123	2,294	+ 171	33	83,348	+ 4,797
Portsmouth Corp.....	,, 4	2,126	2,404	+ 278	...	...	...
Preston Corporation.....	,, 8	934	1,132	+ 198	31⅝	35,752	+ 4,509
Provincial	,, 11	2,018	1,986	— 32	6	13,071	+ 591
Reading Corporation.....	,, 9	759	850	+ 91	31⅝	27,963	+ 2,221
Rhondda Tramways.....	,, 2	1,185	1,326	+ 141	44	56,872	+ 4,991
Rochdale Corporation...	,, 11	1,582	1,624	+ 42	32½	59,150	+ 2,311
Rotherham Corp.....	,, 15	1,174	1,654	+ 480	32⅝	51,421	+ 12,948
Salford Corporation.....	,, 13	4,919	5,370	+ 451	31⅞	180,867	+ 9,502
Sheffield Corporation....	,, 12	9,299	10,849	+ 1,550	33½	350,905	+ 54,086
Southampton Corp.....	,, 8	1,438	1,676	+ 238	31⅞	54,374	+ 5,130
Southend-on-Sea Corp...	,, 8	561	690	+ 129	32	32,307	+ 3,771
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.....	,, 11	735	790	+ 55	32½	27,470	+ 1,323
Sunderland Corp.....	,, 12	1,424	1,631	+ 207	32	53,738	+ 4,245
Sunderlan l District...	,, 8	536	644	+ 108	2	1,219	+ 139
Swindon Corporation ...	,, 8	170	196	+ 26	31⅝	6,651	+ 229
Torquay Tramways.....	,, 2	419	498	+ 79	44	26,848	+ 2,147
Tyneside Trys. & Tmrds.	,, 8	521	588	+ 67	19	13,029	+ 1,018
Wallasey Corporation ...	,, 11	1,123	1,197	+ 74	28½	45,949	+ 2,854
Walsall Corporation.....	,, 11	782	808	+ 26	46	37,222	+ 3,388
Walthamstow U.D.C....	,, 11	721	949	+ 228	32	36,463	+ 6,230
Warrington Corp.....	,, 9	462	522	+ 60	32	16,009	+ 1,342
West Ham Corporation	,, 9	2,870	3,027	+ 157	31⅝	104,867	+ 4,565
Wigan Corporation	,, 9	1,540	1,723	+ 183	32	54,378	+ 4,578
Yorkshire (W. Riding)...	,, 12	1,563	1,886	+ 383	46	81,269	+ 8,347

* Issue of Traffic Returns suspended during the War.

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RAILWAY ELECTRIFICATION.

Tramway & Railway World Descriptions.

(ONE SHILLING EACH, postage prepaid).

ELECTRIFICATION OF THE CHICAGO, MILWAUKEE AND ST. PAUL RAILWAY.

(*Issue of September* 14, 1916.)

This is an account of a high-tension direct-current installation of unprecedented magnitude. The railway extends westward across the American prairies, then over the Rocky Mountains and on to the Pacific Coast. The section now electrified stretches for a distance of 440 miles over three successive mountain ranges, and its construction includes some notable features. The article presents a general description of the arrangements for power supply, the overhead construction, and the electric passenger and goods locomotives. Characteristic curves of both types of locomotives are given. Maps, numerous photographic illustrations and drawings serve to convey a realistic idea of the magnitude of the work.

LANCASHIRE & YORKSHIRE ELECTRIFICATION.

MANCHESTER-BURY SECTION—DIRECT CURRENT SYSTEM AT 1,200 VOLTS.

(*January* 13, 1916.)

A detailed description of the equipment of the Manchester-Bury section, the latest enterprise of the Lancashire and Yorkshire Railway in the electrification of their lines. The first section electrified was the Liverpool-Southport line, which was equipped in 1903-4 by Dick, Kerr and Co., Ltd., on the 500 volt direct current system. In the present instance current at 1,200 volts is sent out on the conductor rails, and the train motors are designed for working at this pressure. The description is accompanied by over 50 clear drawings and photographs.

30 PAGES 13 IN. × 10 IN., WITH 22 DRAWINGS AND 30 PHOTOGRAPHIC ILLUSTRATIONS.

LONDON AND SOUTH-WESTERN RAILWAY ELECTRIFICATION.

EQUIPMENT OF LONDON SUBURBAN LINES.

(*November* 18, 1915.)

The most exhaustive and best-illustrated description of this electrification scheme so far published. The description occupies twenty-eight pages and no fewer than sixty-one illustrations and diagrams aid the text. A detailed description is given of the plant and equipment of the power station, while the rolling stock and main line work are exhaustively dealt with. Speed and power consumption tests are also referred to.

28 PAGES, 13½ IN. × 9 IN., WITH MAP, 15 DRAWINGS, AND 32 PHOTOGRAPHIC ILLUSTRATIONS.

NORTH-EASTERN RAILWAY ELECTRIFICATION.

SHILTON-NEWPORT MINERAL BRANCH.

(*June* 8, 1916.)

A full description of this important and, in some respects, unprecedented undertaking. The description is supplemented by 35 photographs and drawings, including a map, profile of gradients, and diagrams of tests.

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NORFOLK AND WESTERN ELECTRIFICATION.

HIGH TENSION ON THE VIVIAN-BLUEFIELDS SECTION. (*July* 8, 1915.)

A comprehensive description of an important electrification scheme carried out by one of the leading American railways. Single-phase transmission has been employed with three-phase motors.

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CHAPTER V.—RAIL PACKING.

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THE

Tramway & Railway World

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

DUBLIN CORPORATION.

CLEANSING COMMITTEE.

TENDERS FOR TRAMWAY WAGON WHEELS.

The Cleansing Committee of the Dublin Corporation are desirous of obtaining tenders for the supply of Wheels for use in connection with their Tramway Refuse Wagons.

Full particulars, including specification, conditions of contract, drawings, etc., can be obtained at the undermentioned offices on payment of the sum of 10*s.* 6*d.*, which sum will be refunded on receipt of a bona-fide tender. The acceptance of a tender will be subject to ratification by the Municipal Council, but the Committee do not bind themselves to accept the lowest or any tender.

Sealed tenders, marked on the outside "Tender for Wheels," and addressed to "The Chairman, Corporation Cleansing Committee, Lord Edward Street, Dublin," to be forwarded so as to reach the Offices of the Committee not later than 12 o'clock noon on Monday, December 11 next.

FRED J. ALLAN,
Secretary.

Cleansing Committee's Offices,
Lord Edward Street, Dublin.
November 21, 1916.

TO MANUFACTURERS ONLY.

ELECTRIC CABLE AND WIRE.

The Commissioners of H.M. Works, etc., are prepared to receive tenders for the supply of electric cable and wire during a period of one year from January 1, 1917.

Forms of tender, conditions of contract, and all particulars, may be obtained on application to the Controller of Supplies, H.M. Office of Works, King Charles Street, Westminster, S.W.

The Commissioners do not bind themselves to accept the lowest or any tender.

Tenders must be delivered before 11 a.m. on Monday, November 27, 1916, addressed to the Secretary, H.M. Office of Works, etc., Storey's Gate, London, S.W., and endorsed "Tender for Electric Cable and Wire."

H.M. Office of Works, etc.
November 10, 1916.

COUNTY BOROUGH OF SOUTHAMPTON.

TRAMWAY UNIFORMS.

The Corporation invite tenders for the supply of Costumes and Overcoats for the women conductors of the Tramways Department.

Forms of tender may be obtained and samples inspected at the Manager's Office, 161, Above Bar Street.

Sealed tenders, on the printed forms, endorsed "Tender for Tramway Uniforms," must be delivered at the Town Clerk's Office on or before December 22, 1916.

No pledge is given to accept the lowest or any tender.

R. R. LINTHORNE,
Town Clerk.

Town Clerk's Office.
Municipal Offices, Southampton.
November 21, 1916.

POSITIONS VACANT.

CHIEF CLERK.

Chief Clerk (male or female), Motor Omnibus Depot. Traffic experience and some knowledge of engineering terms necessary. Ineligible army.—UNITED AUTOMOBILE SERVICES, LTD., Cockton Hill, Bishop Auckland, Durham.

INSPECTOR.

Inspector required for ticket and traffic work; previous experience with magnetic brake desirable; must be ineligible. State age, experience, etc., to MANAGER, Burton & Ashby Light Railways, Swadlincote, near Burton on-Trent.

JUNIOR SHIFT ENGINEER.

Junior Shift Engineer wanted to assist on evening shift. Commencing salary 30*s.* per week. Must be ineligible for military service.—Apply, stating age, experience, and copies of testimonials, to CHIEF ENGINEER, Electricity Works, Canterbury.

THE BIRKDALE DISTRICT ELECTRIC SUPPLY CO., LTD.

SWITCHBOARD ATTENDANT.

Wanted immediately, two Switchboard Attendants; wages 25*s.* per week. Must be ineligible for military service. Apply, with full particulars of age, training and experience, to—

MANAGING ENGINEER.

Electricity Works, Birkdale, Southport.

SWITCHBOARD ATTENDANT.

Switchboard Attendant required for tramway power station. Valuable experience to be gained with Diesel engines and battery. Must be ineligible for military service. State age, experience and wages required.—BURTON & ASHBY LIGHT RAILWAYS, Swadlincote, near Burton-on-Trent.

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Switchboard Attendant required for combined three-wire lighting and traction supply station. Experience in three-phase generation a recommendation, but not essential. Wages 35*s.* per week, rising yearly 2*s.* 6*d.* per week to 40*s.* Only applications from persons whose present employers are willing to release them will be considered. —Write, stating age, experience, and enclose copies of not more than two recent testimonials, to MR. G. R. SPURR, Electrical and Tramways Engineer, Priory Avenue, Walthamstow.

BOROUGH OF REIGATE.

ELECTRICITY WORKS.

The Reigate Town Council invite applications from persons ineligible for military service for the post of Shift Engineer at their Generating Station, Wray Common Road, Reigate.

Preference will be given to applicants who have had previous experience in H.T. supply, and with Diesel engine plant.

Applications, stating wages required, accompanied by not more than three recent testimonials, endorsed "Shift Engineer," must be delivered to the Borough Electrical Engineer, Wray Common Road, Reigate, on or before noon of Wednesday, December 13 next.

By order,
ALFRED SMITH,
Town Clerk.

Municipal Buildings, Reigate.
November 22, 1916.

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By W. A. AGNEW.
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AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

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SATURDAY, NOVEMBER 25, 1916.

TO SECURE CONTENTED EMPLOYEES.

Two interesting experiments designed to promote the contentment of employees are the yearly bonus conditional on profits instituted by Mr. Nance at Belfast and the periodical conferences with representatives of the men and the consideration of the contents of a suggestion box, to which Mr. Goodyer invited the Croydon employees three months ago. Mr. Goodyer's intention is to discuss matters connected with staff working with two men from each depôt, and the plan may prevent many misunderstandings. A much more extensive scheme to encourage the co-operation of the men has been in operation on the Philadelphia Rapid Railway since 1911. The benefits resulting therefrom have been very marked. In 1909 and 1910 there was a total of 65 days of declared strike, and the changes in the personnel of the employees exceeded 85 per cent., the discharges numbering 2,376, or nearly 50 per cent. of motormen and conductors. During the present year only 117 men were discharged. While in 1910 3,800 men voluntarily left, the total for 1915 was only 175. An increase to 275 this year represents the attraction of the very high wages paid by munition factories. It is now claimed that since Mr. E. T. Stotesbury assumed the management in 1911, with control of policy and business, the company have built up a spirit of concord and loyalty to a point where a strike would be impossible of success. After a short investigation and analysis of suggestions and complaints made by the men, the new management presented to the employees what has since become known as the "co-operative plan." The features of this plan are, first, the creation of a co-operative committee, composed of representatives of the men and the company, which considers and determines all matters relating to working conditions, other than general policy. Secondly, a wage fund was created, out of which payments for wages are made. There is also a co-operative sick benefit fund and a death insurance scheme, the latter maintained by the company for employees of two years' service and over. For this country the most novel features of the Philadelphia plan are the wages fund and the manner in which two rival trade unions are dealt with. The latter aspect of unionism, by the way, exists in London, and was one of the factors that precipitated the strike in 1915 and also contributed to its defeat. The Philadelphia management does not take up a position either for or against the two organisations, and it does not interfere with the liberty of the employees by requiring them to become members of a labour union, but if two-thirds of the motormen and conductors express by secret ballot a desire to become members of either organisation, the company will pay from the sum representing 22 per cent. of the gross passenger earnings the amount that represents the subscriptions of all motormen and conductors to a labour organisation. This plan is designed to prevent the disturbing influence of wearing badges and of organisers and collectors of subscriptions. So far three ballots have been taken to determine whether the company should deal with one or other of the two labour organisations, but in no case have two-thirds of the men indicated a preference. The wages paid have been increased. The chief factors that have enabled the company to earn the necessary increases in receipts have been the elimination of wasted time, the introduction of cars of larger seating capacity, re-routing to increase the rush hour capacity of tracks, and a marked decrease of accidents consequent upon improved discipline and operating methods.

REVISION OF CERTIFIED OCCUPATIONS.

HIGHER EXEMPTION AGES FOR MOTORMEN AND OMNIBUS DRIVERS.

The Press Bureau issued on November 17 a revised List of Certified Occupations (R. 105), which has been prepared, and the ages (which have been generally raised) fixed, after careful inquiry into the industrial needs of the country. The reservations contained in this List of Certified Occupations will be reduced early in 1917 by a further raising of the age limits, especially in the trades not mainly engaged on Government work. At present men in certified occupations, who are under the age limits stated in the list, are entitled to be treated as covered by the list if found by a Recruiting Medical Board to be unfit for General Service (Category A). In the next list this arrangement will be altered so as to make available for the Army men found fit for Garrison Duty Abroad (Category B (i.). The conditions as to age and marital condition, where applicable, are indicated in the list opposite the several occupations. When an age limit for exemption is stated, the age referred to is the age at April 4. Men who had not reached the ages stated on April 4 are not covered, and do not become covered by reason of having subsequently attained the specified age. In the case of agriculture, the age is to be reckoned as at May 1 in England and Wales, and as at May 31 in Scotland. Men who on November 2, 1915, were unmarried or were widowers without any child dependent on them, are to be treated as single men for the purposes of this list. Subjoined are the alterations affecting certain public and public utility services:

	Age at which Reservation begins— Single	Married
Electrical Generating Stations (including those for Tramways and Electric Railways)—		
All classes of workmen	—	—
Gas Works—		
All classes of workmen inside the works	—	—
Omnibuses—		
Head of Department, Foreman	30	25
Motor Driver	41	25
Tramways—		
Traffic Inspector, Chief Storekeeper, Parcel Superintendent	30	25
Driver	41	25

Railway service, including workshops and sheds:—Men to be treated as in a certified occupation in respect of whom the Railway Company have furnished to the Recruiting Officer of the area in which the man resides a certificate stating that he is indispensable to the Company.

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LONDON "SAFETY FIRST" CONFERENCE.

Invitations to a conference regarding a London "Safety First" Campaign have been issued by Mr. H. E. Blain, operating manager of the London General Omnibus Company and the London Underground Railways, to the following authorities in the Greater Metropolitan area :—County, Borough, and District Councils, the Police, the various organisations of Road Users, Trade Unions concerned in traffic, the leading traction and transportation companies and undertakings, including Railway Companies, carriers, and the like. The conference will be held on Friday, December 1, at 3 p.m., at the Caxton Hall, Westminster. In the letter of invitation Mr. Blain says :—"Since the orders for restricted lighting came into operation there has been a marked increase in the number of street fatal accidents within the Metropolitan area, the figures having risen from 411 in the first nine months of 1914 to the appalling total of 577 in the same period of 1916, the number of street accidents of all descriptions in the latter period being no fewer than 34,575. It is felt that the situation calls for the closer co-operation of public authorities, companies and private firms, with the object of minimising the dangers and risks to pedestrians and passengers arising from existing conditions. For some time past the London General Omnibus Company has conducted a 'Safety First' Campaign with most successful results, and it is suggested that the public interest would be served if the principles upon which that movement is based were generally applied and developed. It is proposed to explain to the Conference the character and extent of a scheme for the instruction of employees and the education of passengers and pedestrians in the interests of public safety, and the conference will be invited to co-operate in the preparation of plans to extend the movement to all kinds of street traffic and street conditions within the Metropolitan area. It is hoped that resolutions will be passed appointing a London 'Safety First' Council, with power to nominate Committees for dealing with various aspects of the proposed campaign, such as :—

(1) Courses of instruction for traffic and transport employees ;
(2) The organisation of street traffic with a view to greater public safety and efficiency.
(3) The preparation of schemes with regard to street refuges, 'Safety' notices on lamps, etc., and for the education of the public, and to arrange effective publicity :—(*a*) through the Press ; (*b*) by poster advertisements ; (*c*) by pictorial and other educational means for children ; (*d*) by cinematograph films in picture theatres ; (*e*) by a 'Safety First' Exhibition to which the public would have free admission, etc.
(4) The formation of an adequate organisation to achieve these objects, and the creation of a fund for the purpose of providing the necessary income.

The Mayor of Westminster (Sir George E. Welby) will propose, and Mr. W. Joynson-Hicks, M.P. (Chairman, Automobile Association) will second, the following resolution :—"That this Conference approves of the organisation of a 'Safety First' Campaign in the Metropolitan area." A resolution will be submitted by the Mayor of Hampstead (Alderman E. A. O'Bryen) and seconded by Mr. H. Gordon Selfridge, "That a London 'Safety First' Campaign Council be now elected, with power to co-opt additional members, to establish an adequate organisation, and to take all necessary steps, by the appointment of Committees and any other means, to bring the scheme into prompt operation." Subject to the foregoing meeting with approval, the conference will be asked to proceed with the election of a Council, etc.

PRIVATE BILL NOTICES.

Only two notices of Private Bills relating to traction matters for the ensuing session of Parliament appeared in the "London Gazette" of November 21. Particulars with reference to the Bills are appended.

NOTTINGHAMSHIRE AND DERBYSHIRE TRAMWAYS COMPANY.—To empower the company (1) to purchase and acquire and to sanction and confirm the transfer to and vesting in the company of the Illkeston Corporation Tramway undertaking, together with all the powers, rights, duties, authorities and privileges conferred or imposed by the Ilkeston Corporation Tramways Order, 1899 ; (2) to make provision for the payment by the company of the purchase price and for the application thereof by the corporation ; (3) to constitute the tramways and works part of the undertaking of the company, to extend and apply thereto all or some of the powers conferred upon the company by the Nottinghamshire and Derbyshire Tramways Acts, 1903, 1906, 1908 and 1911, and the enactments incorporated therewith respectively ; (4) to extend the time limited by Section 43 of the Tramways Act, 1870, for the re-purchase by the Corporation of the tramways and undertaking authorised by the Order of 1899 ; and (5) to empower the company and any local authority, company, body or person owning or working any tramways or light railways which can be worked in connection with the tramways of the company to enter into and carry into effect agreements for the sale or transfer to the company of such undertaking. —Parliamentary Agent, Mr. J. Kennedy, W.S., 25, Abingdon Street, S.W.

MYNYDDISLWYN COUNCIL OMNIBUS SERVICES.—To empower the Mynyddislwyn Urban Council, with the consent of the Bedwellty, Abercarn and Risca Urban Councils, and of any other local and road authorities affected, to (1) provide and run omnibuses worked by mechanical and or animal power ; (2) to take fares and charges in respect of passengers, parcels, animals, and goods, to purchase lands and construct depots, sheds, garages, to lop trees along the routes, to provide shelters and waiting-rooms and for that purpose to use any part of any street, park, or open space, to demise to any person, company, corporation or authority their omnibus undertakings or any part thereof ; (3) to empower the several councils or any of them to enter into agreements with respect to the provisions of the intended Act, and to authorise the council and any authorities, companies or persons providing or running omnibuses in any other district adjoining or adjacent to the district to enter into agreements for or with reference to the working, running, leasing, management and maintenance of any omnibus service of the contracting parties, etc. ; and (4) to authorise the council to borrow money for any of the purposes of the intended Act.—Solicitor, Mr. T. C. Griffiths, Blackwood, Monmouthshire ; Parliamentary Agent, Lees and Company, Palace Chambers, Westminster.

YORKSHIRE MANAGERS ASSOCIATION.

At a meeting of this Association, held in Leeds on November 16, there were present Messrs. J. B. Hamilton (Leeds), W. J. McCombe (Hull), R. H. Wilkinson (Huddersfield), E. E. Nicoll (Barnsley), W. Browne (Mexborough), J. V. Moinett (Scarborough), W. McGibbon (Ossett), J. W. Hame (York), E. A. Paris (Liversedge), H. L. White (Grimsby), J. Galloway (Halifax), J. F. Caird (Halifax), J. Parkinson (Dewsbury), C. J. Jewell (Wakefield) and H. England (Wakefield). The members lunched at the Queen's Hotel, and afterwards adjourned to the Tramway Offices. The Secretary announced that he had letters of apology from Messrs. Fearnley, Spencer and Cross, who had to be in London, also a letter of apology from Mr. Acland, who was unable to be present owing to a visit to Manchester. The Chairman (Mr. J. B. Hamilton) initiated a discussion on the requirements of the "competent military authority" respecting the lighting of cars, and after a very full discussion, it was resolved that the Secretary should draft a suitable letter to be sent to the "competent military authority," and also ask that a deputation from the Association should be received. Among other questions discussed were advertisements on cars ; depletion of staffs owing to the requirements of the military authorities, rates of pay, leaving certificates under the Munitions Act, special cars for munition workers, etc. In connection with the discussion which occurred on the rates of pay prevailing on the various tramways in the area covered by the Association, it was suggested that each member should forward to the secretary a statement of the rates of pay, together with all supplementary concessions such as pay for overtime, free riding, uniforms, war bonus, and any other concession given to employees. Mr. Hamilton kindly provided tea, and before the proceedings closed, Mr. Wilkinson proposed, and Mr. McCombe seconded, a hearty vote of thanks to Mr. Hamilton for his hospitality and for presiding over the meeting.

LONDON STREET TRAFFIC CASUALTIES.

The Home Secretary on November 21 presented to the House of Commons the following return showing the number of deaths, the number of persons injured, and the number of accidents known to the police to have been caused by tramway cars, motor omnibuses, and other motor vehicles in the Metropolitan Police district in the years 1914 and 1915 and till the end of October in the present year :—

	No. of persons killed by			No. of persons injured by		
Year.	Tramway cars.	Motor Omnibuses.	Other Motor Vehicles.	Tramway cars.	Motor Omnibuses.	Other Motor Vehicles.
1914 ..	37	148	308	3,171	3,007	8,460
1915 ..	80	154	426	4,001	2,572	9,793
1916 to Oct. 31	63	135	311	3,085	1,810	6,937

In the three years referred to, the number of accidents caused to tramway cars was 5,254, 6,142, and 4,594 respectively ; by motor omnibuses, 6,521, 4,981, and 3,394 ; and by other motor vehicles, 20,150, 21,913, and 15,988.

PROVINCIAL ACCIDENTS DUE TO RESTRICTED LIGHTING.

Reports of fatal and non-fatal accidents caused by public service and other vehicles come from all parts of the country this week, now that the moon is not visible. Most of the cases occurred on Saturday night ; at Glasgow on that evening eleven persons were injured by tramcars, and four by motor-cabs. The fatalities caused by tramcars were at Johnstone, near Glasgow, Hull, Wolverhampton, Bristol, Salford, Gateshead, Darlington, London. In every case the juries attached no blame to the motormen.

Complaints continue to be made all over the country of the danger entailed by the restricted lighting, and at Halifax the Tramways and Watch Committees are making representations to the military authorities to secure permission for better car headlights or more light in the streets. At Manchester the chief constable has issued a warning to drivers of vehicles that their speed must not exceed ten miles an hour and that five miles an hour may, in many circumstances, be dangerous.

The Penny Universal Fare at Plymouth.—The general manager has presented to the Tramways Committee the traffic returns for the period from October 23 to November 11, commencing with the beginning of the through running to Devonport and the introduction of universal penny fares. It showed that during the three weeks the cars carried 1,264,978 passengers, and earned £5,371. the mileage travelled being 98,670 miles, and the average receipts 13.06*d.* per car mile. In the corresponding period of last year, when the tramways were worked as separate sections, and the old fares were in vogue, the number of passengers was 1,011,525, and the receipts £4,385. Dr. S. H. Phillips, chairman of the committee, considers that the innovations have been highly successful. The employees had been worked up to the limit it was thought desirable they should work, and the undertaking lacked sufficient trained drivers.

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MISCELLANEOUS NEWS AND NOTES.

Bristol Tramways Company have decided to employ women as conductors.

Increase of Fare at Stirling.—The Stirling and Bridge of Allan Tramways Company have increased their fare from 3*d.* to 4*d.* for the single journey owing to the increased cost of horses, feeding stuffs, etc.

Tramway Work After the War.—Leeds Corporation have informed the Local Government Board that among the work required to be done after the war will be tramway renewals to the amount of £150,000.

Missed Fares.—The question of missed fares has occupied attention at Walsall, and the Tramways Committee have decided that the fares of passengers who propose to travel on the top deck shall be paid on the car platform.

Difficulty with White Tramway Standards.—As a result of all tramway standards at Halifax having been painted white, travellers on unfamiliar routes have trouble at night in recognising the stopping places.

Rides for Wounded Soldiers.—After a consultation with the officer commanding the local military hospital, arrangements have been made by Cardiff Tramways Committee for providing free rides for wounded soldiers between 2 p.m. and 4 p.m.

Current in a Platform Railing.—When a car on the Chester tramways was brought to a standstill in order to avoid a collision, the conductor took hold of a railing to alight, when he received a shock and was rendered insensible. He was detained for a day in the infirmary.

The Fire at Chesterfield Depot.—A claim for £3,000, the estimated amount of the damage caused by the recent fire at the tramways depot, has been made on the insurance company by Chesterfield Tramways Committee. Two new car bodies and sets of electrical equipment have been ordered.

Battery Vehicle for Breakdowns, etc.—The electric lorry and an electric passenger car which Wolverhampton Corporation have agreed to purchase for the tramways department, will be used for speedy conveyance to breakdowns, repairs and testing, also for supervision by the management.

Tramwaymen and a Conscientious Objector.—At Halifax Tribunal on November 13 a man who had secured exemption on conscientious grounds, conditional on his obtaining work of national importance, stated that he had secured work on the tramways, but he was not allowed to start as the employees objected to him.

New Service in Dublin.—On November 20 the Tramways Company instituted a new service, the termini of which are Westland Row and Fairview. By the innovation the emergency line between O'Connell Street and Talbot Street via Upper Abbey Street and Gardiner Street is for the first time being generally utilised.

Australia and German Goods.—An announcement has been made by the Premier of Australia that in every case where contracts previously existed for the supply of German and Austrian goods to Government departments, arrangements have been made for supplies to be obtained either locally or from British, American, and Japanese firms.

Need for Vigilance by Conductors.—While a motorman had left his car for a moment at the top of Pentre Hill, Rhondda, a boy got on the footboard and released the brake, with the result that the car ran down towards the railway station, smashing a motor wagon and a horse-cart. The woman conductor jumped off. No passengers were injured.

Accrington Battery Vehicle Proposal.—The Health Committee of Accrington Corporation have reported in favour of purchasing a battery-driven wagon for the collecton of refuse. The cost is given as £1,000, and the committee estimate that a motor wagon will effect a saving of 10 to 15 per cent. on the charge for carrying out the work with team labour.

Smart Work with the Lifeguard.—The Leeds magistrates on November 20 fined a man 5*s.* for drunkenness on the night of November 18. He was lying across the tramway rails in Marsh Lane, but was picked up on the lifeguard of a car thanks to the prompt action of Inspector Hewitt, who was driving. The justices complimented the inspector on the promptitude with which he acted.

Institution of Automobile Engineers.—The next meeting will be held in the hall of the Royal Society of Arts, John Street, Adelphi, W.C., on December 13, at 8 p.m., when Mr. F. W. Lanchester will read a paper entitled "Worm Gears and Worm Gear Mounting." Cards of invitation may be obtained on application to the Secretary of the Institution of Automobile Engineers, 28, Victoria Street, London, S.W.

Linking Up in West Scotland.—Mr. Geo. Balfour, of the Scottish Central Electric Power Company and other undertakings, has been appointed chairman of a committee appointed to discuss the question of linking up electricity undertakings in the West of Scotland. Mr. Whysall (Greenock) is the vice-chairman, and Mr. Lackie, electrical engineer to Glasgow Corporation, is a member of the committee.

Methods of Lighting Cars.—On the tramcars running between Blackpool and Lytham one lamp at each end serves to light both the car and the coloured discs outside. A Manchester writer offers "a word of gratitude to the management of the Salford cars, who, by properly arranged curtains, have made possible an increase of the interior lighting, which adds a great deal to the convenience and comfort of the passengers."

Lanarkshire Wages Arbitration.—The Board of Trade have appointed Sheriff Mackenzie, K.C., as arbiter in the disagreement between the Lanarkshire Tramways Company and their employees. The matter for arbitration is a question of an advance of 6*d.* per day claimed by the conductors, and the levelling up of the recent advance to drivers of 9*d.* per day all round. In September last the drivers were granted an advance ranging from 5*d.* to 9*d.* per day.

Doncaster By-Law Concerning Fares.—The Board of Trade have provisionally approved the Doncaster Corporation's new tramway by-law as follows:—"Each passenger shall, either on demand or before leaving the car (whichever first happens), pay to the conductor or other duly authorised officer of the Corporation the fare legally obtainable for his journey, and shall accept a ticket therefor. Any person leaving a car shall be deemed to have completed his journey."

London Post Office Railway.—Mr. A. Ross, president of the Institution of Civil Engineers, has issued his award on the application of the Great Eastern Railway that the contractor for the construction of the Post Office underground electric railway should be compelled to use compressed air in a portion of the tunnel to be made under the hotel and a portion of the offices at Liverpool Street Station. The arbitrator has decided that it is not necessary to use compressed air in carrying out the works.

Track Doubling to Prevent Accidents.—With a view to prevent a recurrence of the recent accident on the curve at Clifton Place, Newport, Mr. Nichols Moore, borough electrical and permanent-way engineer, has obtained the sanction of the Board of Trade to doubling the track and interlacing the track between Charles Street and the curve. The latter improvement would do away with the facing points. The Tramways Committee have decided to defer the carrying out of this portion of the alterations.

Single Deck Car and Trailer at Birmingham.—Following the recent experiment with a double deck motor-car and a single deck trailer, Mr. Alfred Baker, the general manager at Birmingham, is now operating on the Washwood Road route two single deck units. The new method is held to be more suitable for the 3 ft. 6 in. gauge, and it is reported to have been so successful that it will probably be extended to several busy routes. Expeditious loading and unloading is achieved owing to the absence of a top deck to the motor car.

Rail Traffic not a Guide to Zeppelins.—The Field-Marshal Commanding-in-Chief the Home Forces has issued a statement with regard to suggestions made by local authorities that there is danger during aircraft raids from tramways and railways. Lord French says: "It is confidently believed that it is only necessary to assure the public that the continuance of railway and tramway traffic does not serve as a guide to hostile aircraft, and is of vital importance for the successful prosecution of the war, for them to accept the decision and co-operate in carrying it out with loyalty and patriotism."

Extensions of Time.—The Board of Trade have extended for one year from September 6 the time limited by the Birmingham Corporation Light Railways Order, 1912, for the completion of works, and by the Birmingham Corporation (Quinton) Light Railway Order, 1913, for compulsory purchase of lands and completion of works. Manchester Corporation are applying for an extension of time for the construction of the authorised tramways in the districts of Barton-upon-Irwell, Northenden, Sale, Stretford, and Urmston, and in the city.

Linking-up Power Stations at Norwich.—In response to the Board of Trade's suggestion the Norwich Tramways Company have linked up their generating stations with that of the Corporation. Mr. F. W. Ketley, the manager and engineer of the company, in discussing the position of his technical staff with the local Military Tribunal, stated that by taking the step referred to the company were in a position to give the city a certain amount of energy, but the Corporation were not able to reciprocate because of the difference in tension. This could not be altered without an expenditure of about £2,000 for a rotary converter and other plant.

Board of Trade and Fuel Economy.—Mr. F. Ayton, borough electrical engineer and tramways manager at Ipswich, in his annual report on the working of the electricity department, refers to the ash contents of the coal as amounting to the high figure of 20 to 23 per cent., and he suggests that as the ashes use up railway accommodation and fuel for haulage, the Board of Trade Committee dealing with coal saving might be better employed in looking into the working of the colleries rather than adjuring electric supply undertakings to reduce their consumption by methods that will not produce the result aimed at.

The Definition of Motor Spirit.—The Commercial Motor Users' Association obtained an official interpretation of the meaning of the term "motor spirit," over which there has been controversy since the Order in Council of August 18. A communication was forwarded to the Home Office strongly representing "the expediency of issuing an immediate instruction to chief constables to allow no prosecutions to be instituted under the Order unless the fuel in question pays the petrol tax." The Association have now been informed by the Home Office that, after consultation with the Board of Customs and the Board of Trade, the Secretary of State has made a suggestion to the police forces on the lines suggested.

Rawtenstall-Bacup Arbitration.—As the arbitrator appointed by the Board of Trade, Mr. J. M. McElroy, general manager of Manchester Corporation Tramways, on November 20, heard evidence in the dispute between the above corporations on the proposal of Rawtenstall to alter the fares and stages. The latter council propose to increase the number of stages between Bacup and Waterfoot, so that the fares would be 1½*d.* from Bacup to Stacksteads and 2½*d.* from Bacup to Waterfoot, instead of 1*d.* and 2*d.* respectively. The contention of Rawtenstall was that Bacup passengers were getting more than their due proportion as the stages exist at present, giving them undue advantage over passengers using the length between Waterfoot and Rawtenstall. Bacup Corporation contended that the increases proposed were in Bacup borough, and held that the existing fares of 1*d.* to Stacksteads and 2*d.* to Waterfoot should not be altered.

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Curtailment of Services.—On account of the inadequate lighting and the shortage of staff, the management of the Bradford Corporation Tramways on November 15 begun to curtail the services by half an hour. The restriction will be gradually extended to every route. The tramway employees at Newcastle-on-Tyne have asked the manager to arrange for a cessation of traffic at 10.30 p.m. during the winter, in order to relieve the drivers of the strain due to early morning and late evening work in imperfectly lighted streets. Mr. E. Hatton, the manager, has brought the request to the notice of the Tramways Committee, with the result that the question is to be discussed with the managers of places of amusement with a view to securing earlier closing of those establishments. At Portsmouth the public have accepted without complaint the innovation of the last cars leaving the termini an hour and a half earlier. With the cars now set free a new service has been put on between the Town Hall and Copnor, and it is meeting with success.

Women as Drivers.—Women drivers appeared on several tramcars at Nottingham on November 20. At Leicester three women have been trained as drivers in order that the Tramways Committee can decide whether the experiment shall be continued. Although the general manager of the Ilford Council Tramways stated that the Metropolitan Police would not licence women as drivers the County Tribunal on November 20 decided that two out of seven motormen appealed for must join the army. The others were given temporary exemption. Twenty of the 32 women employed in the Ayr Corporation Tramways have been trained to drive the cars. At Coventry a woman was summoned for driving a tramcar without having obtained a licence to act as driver. A constable stated that the motorman was standing at her side. She drove over the points very carelessly, and he afterwards asked her for her licence. Mr. T. R. Whitehead, the manager, said defendant had contravened the regulations, and the case was dismissed on payment of costs. Carlisle Watch Committee have refused to licence women as drivers.

Effect of War on Lowestoft.—An inquiry has been held at Lowestoft into an application by the Corporation for the issue of a Provisional Order to amend the Corporation Act so as to empower the Corporation to borrow temporarily for current expenses, and to empower them to borrow for the purposes of money previously borrowed by them, etc. The town clerk stated that the war had caused a complete loss of the visiting seasons, and almost a complete loss of fishing seasons, and, owing to the calling in of mortgages, and the increased rates of interest, the Corporation had had to call upon their bankers for considerable advances. The borough accountant observed that the council had generally an overdraft with regard to the tramways, but if the war had not broken out there would have been a profit for the first time. The working expenses for 1915 were £7,053, and for the previous year £7,936. The loss in 1915 was £2,670, and the loss for last year was estimated at £3,500.

Damages Against Tramway Companies.—At Bristol Assizes on November 20 a jury awarded a special constable and solicitor, Mr. J. W. Clough, £1,511 damages against the Bristol Tramways and Carriage Company, in a claim on account of injuries sustained through the alleged negligent driving of a motor-cab belonging to the defendants. Plaintiff stated that he was walking about eight feet from the kerb at 10.45 p.m., examining the houses, when the cab came behind him. He left plenty of room for the vehicle to pass, when suddenly the horn sounded and the vehicle was on top of him. Plaintiff sustained a fracture of the left leg, an injury to the right ankle, and concussion of the brain. His medical and other expenses amounted to £511. The driver's version was that the pedestrian kept about a yard from the gutter until the cab was within a yard of him, when he plunged across the front of the vehicle. Judgment was entered for plaintiff with costs. Lanarkshire Tramways Company, in the Court of Sessions, Edinburgh, paid a sum in settlement of the action in which a domestic servant sued for £200 damages for injuries received by her in an accident. She was seated in a car which was standing between Ross Gate and Clyde Bridge. A car ran into it and she was thrown to the floor.

Loss of Traffic at Birmingham.—The suspension of tramway traffic at Birmingham during the slack hours owing to the breakdown at the generating station is entailing a loss of from £2,000 to £3,000 a week. Until the shortcomings are remedied the cars continue to be stopped at the less busy periods of the morning and afternoon, and there are also occasional stoppages at other periods. On November 16, for example, there was a ten minutes' interruption at 6.40 p.m. In an article published in the "Sheffield Daily Telegraph," detailing the experiences of Birmingham as a warning to other towns, the writer says: "Just before the war Birmingham was considering a scheme for the creation of a new power station. The war came. Immediately the cry was: 'Down all new schemes.' The power station scheme was 'downed.' Extensions to the works in Summer Lane have been made, and their capacity has been increased by from 50 to 60 per cent.; but this is not nearly enough. The existing plant is also rapidly wearing out. It was never contemplated that it would be kept running night and day at the highest pressure." Adverting to Sheffield the writer observes that the city "may be thankful it has an enterprising Electricity Committee, and a general manager who has looked ahead. I am not sure that the Committee has kept pace with his requirements, but with the experience of Birmingham before them there can be no more thought of delay in tackling the new power station scheme. The trouble now is that Parliament has to be consulted before Sheffield can move." A further breakdown at Summer Lane station on November 19 caused the issue of a notice that it might be necessary to suspend the services between 9.30 a.m. and 6 p.m. on the following day. By working throughout Sunday night the officials and staff were able to provide traction energy at 12.50 p.m. on the 20th after the supply had been cut off from the usual hour of 9.30 a.m.

PERSONAL.

Mr. Robert Owen, deputy electrical engineer to Leeds Corporation, has been appointed borough electrical engineer at Wigan. One hundred and six applications were received.

Second-Lieutenant A. R. Fyfe, R.E., son of Mr. Fyfe, works superintendent of Aberdeen Corporation Tramways, has sustained a gunshot wound on the right knee. Mr. Fyfe joined up from the engineering staff of the borough surveyor.

Death of Sir George White.—We regret to announce the sudden death at Bristol on Wednesday last of Sir George White, the chairman of the Bristol Tramways and Carriage Company, the Imperial Tramways Company, and of other companies. Sir George, who was 62 years of age, began his business career as a boy in the office of a Bristol solicitor, where he acquired a knowledge of private bill legislation that proved of great utility in after years. He was appointed secretary of the local tramways company in 1874, but a year later he became a stockbroker, and devoted his attention to securing the control of breweries and of isolated and semi-derelict railways, converting them into main line systems. In 1893, Sir George and his brother assumed control of the Imperial Tramways Company, and were joined by Sir Clifton Robinson in promoting electrification at Bristol, Dublin, Middlesbrough, and other places. Subsequently the three gentlemen reconstructed and extended the undertaking of the West Metropolitan Tramways into the London United Tramways after a long and strenuous struggle. From this company Sir George retired in 1903. In 1910 he established the Bristol and Colonial Aeroplane Company at Bristol, which was the first aeroplane factory in England, and has proved of untold advantage to the Empire. Sir George had the foresight to develop road motor vehicles for public and private service in the West of England, the company also being a large manufacturer. Sir George was knighted in 1904, and was a generous supporter of the Bristol Hospital and the British Red Cross Society. To the care of the wounded he devoted much attention.

CONTRACTS AND ORDERS.

Walthamstow Council have placed the following contracts:—Babcock & Wilcox, water-tube boiler, economiser, steel chimney, pipe work, hotwell tank, feed pump, and induced draught tank; Bruce Pebble & Co., 1,000kw. motor converter; British Thomson-Houston Co. and General Electric Co., switchgear.

FINANCIAL REPORTS AND MEETINGS.

East Ham Corporation Tramways.—The report of the East Ham Corporation tramways (of which Mr. W. C. Ullmann is engineer and manager) for the year ended March 31, 1916, shows a marked improvement in the position. The total revenue amounted to £66,884, as compared with £60,232 for the previous year; the operating costs were £53,485 as compared with £51,619, while the gross profit was £13,399, compared with £8,613. After providing for repayment of interest and principal, there was a profit of £1,052, as compared with a deficit of £3,524 in the previous year. The total operating costs per car mile amounted to 7.89*d.*, the ratio of operating costs to revenue being 79.9 per cent., as compared with 85.7 per cent. The total revenue per car mile was 9.87*d.*, and the average energy consumption 1.50 units. No less than 51.30 per cent. of the passengers were carried for a ½*d.* fare, the percentage of receipts from this source amounting to 32.35.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-four of the principal tramway undertakings in the United Kingdom for the week ended November 11 give total receipts of £180 704, or £12,944 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or sixty-six more than for the corresponding week. The receipts this year were at the rate of £81 1*s.* 2*d.* per mile of single track, and last year at the rate of £77 11*s.* 8*d.*, thus showing an increase for the week of £3 9*s.* 6*d.* per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. Nov. 23	A Week Ago.
5%	5%	Alabama Traction. 5% 1st. Mt.	—	67	79½	75⅜
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	64/4½	65/-
4%	4%	Do. 4% Deb. ...	100	91	67	68½
4½%	4½%	Do. 4½% Deb. ...	100	98½	75	74⅜
5%	5%	Do. 5% Deb. ...	100	96	67⅜	68½
1/-	7d	Auckland Elec. Trams. Ord. ...	1	1⅜	21/-*xd*	21/-*xd*
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	93⅜	94⅛
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅛	10⅜	10⅜
4½%	4½%	Do. 4½% Deb....	100	96	83	83
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	91½	91½
$1	$1	Brazilian Trac. & Power Ord....	$100	66	50⅜	53⅜
$1½	$1½	Do. 6% Cum. Pref.	$100	97	91	92½
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7⅛	6⅜	6⅜
2/6	2/6	Do. 5% Cum. Pref.	5	5	85/-	85/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101⅛	92	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	58⅞	58⅞
6%	5%	Do. Pref. Ord....	100	106	48	56½
5%	5%	Do. 5% Cum. Pref.	100	103	68½	68½
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	88½	88½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	60½	61
—	£3*	Brit. Elec. Trac. Ord.	100	—	34	35
—	6%	Do. 6% Cum. Part Pref. ...	100	—	77½	77
5%	5%	Do. 5% Deb.	100	92	82½	82½
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	69⅜	69⅜
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	81½	81½
3/-	6/6	Calcutta Tramways, Ord. ...	5	7½	6⅞	6⅜
1/3	1/3	City of B.A. Trams.	5	5½	86/3	84/4½
5/-	4/-	Dublin United Trys 6% Pref.	10	12	10⅜	10⅜
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79⅜	79⅜
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	27/6	27/6
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74⅜	74⅜
—	—	La Plata Trams. Ord.	1	⅜	2/1½	2/1½
6/-	6/6	Lanarkshire Trys. Co.	10	10⅜	9⅜	9⅜
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9⅜d.	9⅜d.*	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	1/16	2/3	2/3
6d.	6d.	Do. 5% Pref.	1	7/16	8/3	7/6
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	64½	64½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88	88
5%	5%	Do. 5% Inc. Deb.	100	88½	79½	79½
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	47⅜	47⅜
3/-	3/-	Madras Elec. 6% Pref. ...	5	5⅛	96/6	96/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	66⅜	66⅜
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	68	68
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	74½	74½
$1½	$1½	Mexico Trams. Common ...	$100	70	27	27
5%	5%	Do. 1 Mt. 5% G.B.	—	84	30	43½
6%	6%	Do. 6% Mt. Bds.	100	76	30	30
4½%	4½%	Montreal St.4½%Stg.Debs.(1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95	95
1/-*	1/2½*	National Steam Car	1	1/16	19/10½	18/9
9⅜d.*	9⅜d.*	New General Traction	1	⅞	7/9⅜	7/9⅜
5⅜d.	6d.	Northern Gen. Trans. Ord. ...	1	8/16	14/-	15/4½
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	68/-	68/9
5%	5%	Do. 5% 1st Deb.	100	89½	74½*xd*	74½*xd*
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80⅜	80⅜
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	1/16	10/10½	10/9
10d.	8d.	Provincial Trams. Ord.... ...	1	⅞	20/6	17/-
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84	84
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	91⅜	91⅜
5%	5%	1st. Mt. 5% 50 yr.	100	89½	76	75⅛
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	90⅜	90⅛
5%	5%	Do. 5% Perp. Deb.	100	99½	77½	77⅛
—	—	Singapore Elec. Trams	5/-	⅛	4/10½	4/10½
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	96½	96½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	81	81
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	97⅜	97⅜
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	77	77
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	9/3	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4⅛	95/-	95/-
—	—	Metropolitan Dist. Ord. ...	100	21⅜	16⅜	15⅛
—	—	Undgd. Elec. Rys. of London ...	10	2½	40/-	39/4½
		Do. "A"	1/-	⅜	6/7½	7/1½
4½	4½	Do. 4½% Bds of 1933 Rd.	—	99	102	102
6	6	Do. 6% 1st Cum. In. Db.	100	114	102	101½
6	6	Do. 6% In. Bonds Rd. ...	—	88	91½	90½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1915	Latest Return. 1916	Aggregate. Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	Nov.18	£51,294	£53,617	47	£2,349,740	+ £5,062
Auckland.....(28 days)	Oct. 20	20,831	21,428	16	84,286	+ 1,160
Ballarat and Bendigo ...	Sept. 10	3,075	2,850	24	18,720	+ 611
Brazilian Traction Mlrs.	Sept.	6,494,000	6,920,000	39	61,249,000	+3,791,890
Brisbane	Oct.	31,880	32,760	44	330,420	+ 23,466
British Columbia.....$	Sept.	517,022	540,440	13	1,629,026	+ 94,155
Buenos Aires Lacroze ...	Oct. 4	42,516	39,670	17	151,615	+ 13,184
Burmah Tramway ... Rs.	Sept.	22,163	23,749	9	48,161	— 839
Calcutta.....Rs.	Nov. 18	59,583	73,292	47	3,132,512	+ 170,042
Cape Town	Oct.	...	14,238	...	...	...
Carthagena & Herrerias..	Oct.	2,169	2,539	44	25,139	+ 7,390
Cordoba	Sept.	13,210	13,389	26	84,554	+ 648
Costa Rica	July	3,046	3,223	...	...	...
East India	Oct.	2,069	2,080	13	7,125	+ 736
Hong Kong .....$	Oct. 14	11,227	14,220	44	598,132	+ 145,583
Kalgoorlie	Aug.	3,165	3,021	35	20,479	— 1,640
La Plata	Oct.	4,405	4,435	44	42,057	— 227
Lima	Sept.	30,530	33,348	39	304,058	+ 15,777
Lisbon .....Escu.	Sept.	...	194,276	...	...	...
Madras .....(2 weeks)	Nov. 15	29,441	31,596	45	665,506	+ 47,182
Manila	July	23,750	33,700	31	887,739	+ 39,986
Manaos .....Rs.	Aug.	...	147,774	...	...	...
Melbourne	May	...	69,275	...	...	...
Montevideo	Sept.	25,070	26,711	48	319,043	+ 15,626
Pernambuco	Nov. 19	3,283	3,555	46	141,047	— 1,018
Peruvian .....$	Oct.	806,900	945,590	18	3,588,830	+ 482,773
Port Elizabeth	Oct.	...	3,131	...	...	...
Rangoon	Oct.	4,886	5,043	44	46,371	— 1,844
Shanghai .....$	Nov. 18	27,743	33,204	...	...	...
Singapore .....$	Oct. 14	11,787	13,617	40	517,747	+ 54,575
Toronto.....$	Sept.	804,902	913,535	39	8,005,764	+ 855,159
Winnipeg	Sept.	261,982	267,497	39	2,461,454	— 51,995

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	Latest Return. 1916	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Aggregate. Incr. or Dec.
Aberdare U.D.C.	Nov. 14	£402	£450	+ 48	33	£13,155	+ £1,519
Aberdeen Corporation...	,, 15	1,606	1,817	+ 211	24	46,905	+ 2,684
Accrington Corp.	,, 15	504	550	+ 46	33	19,376	+ 794
Ayr Corporation	,, 18	229	265	+ 36	27	12,714	+ 1,110
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	,, 19	1,286	1,444	+ 158	33½	51,892	+ 5,383
Birmingham Corp.	,, 18	15,229	13,047	— 2,182	33	537,879	+ 62,810
Do. Motor Omnibuses	,, 18	798	1,108	+ 310	33	33,479	+ 4,639
Blackburn Corp.	,, 15	1,065	1,139	+ 74	33⅔	43,099	— 994
Blackpool & Fleetwood.	,, 18	284	297	+ 13	46	42,126	+ 4,831
Blackpool Corp.	*	...	...	...	...	...	...
Bolton Corporation	,, 19	2,461	2,661	+ 200	34	98,280	+ 7,021
Bournemouth Corp.	,, 22	1,559	1,832	+ 273	34	81,255	+ 6,449
Bradford Corporation	,, 18	5,856	6,233	+ 407	33	229,815	+ 8,239
Brighton Corporation ...	,, 19	844	971	+ 127	33⅔	44,343	+ 4,761
Bristol	,, 17	9,596	9,762	+ 166	46	465,644	+ 24,109
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation	,, 18	1,425	1,535	+ 110	34	58,535	+ 3,384
Burton-on-Trent Corp...	,, 19	258	263	+ 5	33	9,326	— 493
Bury Corporation	,, 19	1,146	1,220	+ 74	33⅔	48,888	+ 2,324
Cardiff Corporation	Oct. 21	2,540	2,993	+ 453	29	89,500	+ 8,031
Chatham & District	Nov. 16	988	1,191	+ 203	46	57,013	+ 3,103
Chesterfield Corp.	,, 16	256	260	+ 4	33	9,353	+ 296
Colne Corporation	,, 18	219	249	+ 30	...	...	...
Cork Electric	,, 16	442	514	+ 72	46	23,634	+ 419
Croydon Corporation ...	*	...	...	...	...	...	...
Derby Corporation	,, 18	979	1,010	+ 31	33⅓	38,447	+ 2,828
Dover Corporation	*	...	...	...	...	...	...
Dublin & Lucan	,, 18	103	130	+ 27	20	3,456	+ 280
Dublin United	,, 17	5,513	6,171	+ 658	46	280,755	+ 241
Dundee City	,, 15	1,267	1,355	+ 88	26⅔	37,256	+ 837
East Ham Corporation	,, 18	1,225	1,192	— 33	32½	44,095	+ 251
Exeter Corporation	,, 17	304	372	+ 68	33	13,673	+ 659
Glasgow Corporation	,, 18	19,687	23,463	+ 3,776	24⅔	576,453	+ 42,828
Glasgow Subway	,, 18	1,300	1,236	— 64	46	52,888	+ 4,322
Glossop (U. Elec. Supp.)	,, 18	122	134	+ 12	47	6,554	+ 652
Halifax Corporation	,, 14	1,886	1,980	+ 94	32½	75,281	+ 1,038
Do. Motor Omnibuses	,, 14	40	47	+ 7	32½	1,651	— 24
Hastings & District	,, 17	706	771	+ 65	46	48,531	+ 3,121
Huddersfield Corp.	,, 18	2,392	2,575	+ 183	33	95,634	+ 8,286
Hull Corporation	,, 18	3,084	3,151	+ 67	33	104,377	+ 1,890
Ilford U.D.C.	,, 18	574	587	+ 13	33	23,042	+ 1,246
Ilkeston Corporation ...	*	...	...	...	...	...	...
Ipswich Corporation	,, 18	446	416	— 30	33	17,755	— 1,046
Isle of Thanet	,, 18	219	245	+ 26	7	2,034	— 1
Kilmarnock Corp.	,, 18	147	168	+ 21	26⅔	4,763	+ 131
Lanarkshire	,, 16	1,904	2,340	+ 436	46	106,835	+ 15,444
Lancashire United	,, 15	1,537	1,803	+ 266	46	84,718	+ 4,722
Leeds City	,, 18	8,437	9,418	+ 981	34	330,553	+ 30,106
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	,, 18	670	834	+ 164	26⅔	23,896	+ 2,967
Leyton U.D.C.	,, 16	1,458	1,512	+ 54	33	55,946	+ 1,128
Liverpool Corporation...	,, 18	12,505	13,983	+ 1,478	46½	652,581	+ 36,535
Llandudno & Colwyn B.	,, 10	190	221	+ 31	49½	18,198	+ 1,167
London County Council	,, 1	43,741	47,482	+ 3,741	30½	1,502,748	+ 147,331
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation...	*	...	...	...	...	...	...
Maidstone Corporation..	,, 16	179	199	+ 20	33	7,434	— 103
Manchester Corp.	,, 18	16,342	18,108	+ 1,766	32	632,146	+ 34,814
Met. Elec. Trys.	*	...	...	...	...	...	...
National Steam Car.....	*	...	...	...	...	...	...
Nelson Corporation	,, 11	187	185	— 2	32½	6,993	+ 538
N'castle-on-Tyne Corp.	,, 18	5,596	6,772	+ 1,176	33	224,167	+ 12,947
Newport (Mon.) Corp....	,, 18	752	929	+ 177	33	32,181	+ 3,796
New St. Helens & Dist.	,, 15	882	1,039	+ 157	20	23,486	+ 1,842
Northampton Corp.	,, 17	629	724	+ 95	33	23,876	— 896
Nottingham Corp.	,, 16	3,559	3,923	+ 364	33	131,196	+ 6,095
Oldham Corporation ...	,, 19	2,006	2,108	+ 102	34	85,456	+ 4,899
Portsmouth Corp.	,, 18	1,960	2,144	+ 184	...	...	...
Preston Corporation	,, 15	927	1,106	+ 179	32⅔	36,859	+ 4,688
Provincial	,, 18	1,945	1,927	— 18	7	14,909	+ 336
Reading Corporation	,, 16	714	838	+ 124	32⅔	28,802	+ 2,344
Rhondda Tramways	,, 9	1,179	1,273	+ 94	45	58,146	+ 5,085
Rochdale Corporation...	,, 18	1,472	1,521	+ 49	33⅓	60,671	+ 2,360
Rotherham Corp.	,, 22	1,140	1,546	+ 406	33⅔	52,968	+ 13,354
Salford Corporation	,, 20	4,656	5,056	+ 400	32⅔	185,923	+ 9,829
Sheffield Corporation. ...	,, 19	9,086	10,353	+ 1,267	34⅓	361,259	+ 55,325
Southampton Corp.	,, 15	1,426	1,666	+ 240	32⅔	56,041	+ 5,370
Southend-on-Sea Corp...	,, 22	545	601	+ 56	34	33,602	+ 3,945
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	,, 18	700	828	+ 128	33⅓	28,298	+ 1,429
Sunderland Corp.	,, 19	1,379	1,555	+ 176	33⅓	55,293	+ 4,420
Sunderland District...	,, 8	536	644	+ 108	2	1,219	+ 139
Swindon Corporation ...	,, 15	173	207	+ 34	32⅔	6,858	+ 263
Torquay Tramways.....	,, 9	398	454	+ 56	45	27,303	+ 2,203
Tyneside Trys. & Tmrds.	,, 15	495	617	+ 122	20	18,647	+ 1,140
Wallasey Corporation ...	,, 18	1,060	1,197	+ 137	29½	47,147	+ 2,992
Walsall Corporation.....	,, 18	769	807	+ 38	47	38,029	+ 3,426
Walthamstow U.D.C....	,, 18	718	933	+ 215	33	37,396	+ 6,446
Warrington Corp.	,, 9	462	522	+ 60	32	16,009	+ 1,342
West Ham Corporation	,, 16	2,831	2,997	+ 166	32⅔	107,864	+ 4,731
Wigan Corporation	,, 16	1,497	1,701	+ 203	33	56,083	+ 4,780
Yorkshire (W. Riding)...	,, 19	1,420	1,569	+ 149	47	82,838	+ 8,496

* Issue of Traffic Returns suspended during the War.

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Tramway & Railway World Descriptions.

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(*Issue of September* 14, 1916.)

This is an account of a high-tension direct-current installation of unprecedented magnitude. The railway extends westward across the American prairies, then over the Rocky Mountains and on to the Pacific Coast. The section now electrified stretches for a distance of 440 miles over three successive mountain ranges, and its construction includes some notable features. The article presents a general description of the arrangements for power supply, the overhead construction, and the electric passenger and goods locomotives. Characteristic curves of both types of locomotives are given. Maps, numerous photographic illustrations and drawings serve to convey a realistic idea of the magnitude of the work.

LANCASHIRE & YORKSHIRE ELECTRIFICATION.
MANCHESTER-BURY SECTION—DIRECT CURRENT SYSTEM AT 1,200 VOLTS.
(*January* 13, 1916.)

A detailed description of the equipment of the Manchester-Bury section, the latest enterprise of the Lancashire and Yorkshire Railway in the electrification of their lines. The first section electrified was the Liverpool-Southport line, which was equipped in 1903-4 by Dick, Kerr and Co., Ltd., on the 500 volt direct current system. In the present instance current at 1,200 volts is sent out on the conductor rails, and the train motors are designed for working at this pressure. The description is accompanied by over 50 clear drawings and photographs.

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(*November* 18, 1915.)

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
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WEEKLY LIST OF TENDERS INVITED.

COUNTY BOROUGH OF SUNDERLAND.

CORPORATION ELECTRICITY SUPPLY.

TO MAKERS OF STEAM TURBINES.

The Corporation of Sunderland are prepared to receive Tenders for the installation of a steam turbine, alternator and condensing plant for their Hylton Road Electricity Works.

Specification and form of Tender can be obtained in duplicate, upon application to the General Manager, Mr. Alfred Blackman, Electricity Offices, Dunning Street, Sunderland, upon payment of a deposit of £3 3s. (three guineas). The deposit will only be returned after a bona-fide Tender has been opened by the Committee and after both copies of the specification and form of Tender have been returned intact.

Sealed Tenders, endorsed "Tender for Electricity Works," and addressed to the Chairman of the Electricity Committee, Town Hall, Sunderland, must be delivered at my office, not later than first post on Saturday, December 9, 1916.

The Corporation do not bind themselves to accept the lowest or any Tender.

HENRY CRAVEN,
Town Clerk.

Town Hall, Sunderland,
November 24, 1916.

COUNTY BOROUGH OF WARRINGTON.

ELECTRICITY DEPARTMENT.

The Electricity and Tramways Committee of the County Borough of Warrington invite Tenders for twelve months' supply of earthenware conduit.

Specification and form of Tender can be obtained from the undersigned on payment of one guinea, which will be returned on receipt of a bona fide Tender. Five shillings will be charged for extra copies of the specification.

Tenders, addressed to the "Chairman of the Electricity and Tramways Committee, Town Hall, Warrington," must be sealed with wax, and endorsed "Tender for Earthenware Conduit," and delivered not later than 12 o'clock noon on Tuesday, December 12, 1916.

The lowest or any Tender will not necessarily be accepted.

F. V. L. MATHIAS,
Borough Electrical and Tramways Engineer.

Howley, Warrington.

BRADFORD CORPORATION.

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The Bradford Corporation invite specifications and quotations for motor-driven or other mechanically-propelled Road-sweeping Machines.

Particulars to be delivered not later than Tuesday, December 5, 1916, to Mr. W. H. Inger, superintendent of the Street Cleansing Department, Harris Street, Bradford.

FREDERICK STEVENS,
Town Clerk.

Town Hall, Bradford,
November 23, 1916.

POSITIONS VACANT.

CITY OF BIRMINGHAM ELECTRIC SUPPLY DEPARTMENT.

BOILER HOUSE SHIFT ENGINEER.

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Applicants must have had a sound mechanical and engineering training, and must have had previous charge of fairly large installations of high-pressure steam boilers fed with mechanical stokers.

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R. A. CHATTOCK,
City Electrical Engineer.

Electric Supply Department,
14, Dale End, Birmingham.
November 28, 1916.

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SATURDAY, DECEMBER 2, 1916.

"SAFETY FIRST" CONFERENCE.

Notwithstanding the stringent conditions under which people are living as regards street "lighting" as a means of defence against air raids, it is remarkable that, with the exception of London, little or nothing has been done to instil into the minds of the public an appreciation of the need for greater care when using the roads. Individual traffic authorities have, it is true, added verbal and printed exhortation to the caution that the blackness of the night has impressed upon their drivers, but it is the pedestrian who needs to be specially warned. At none of the inquests into street fatalities now taking place almost daily throughout the country in moonless weeks has a jury done otherwise than exonerate drivers from blame. The marvel is that the Metropolis is the scene of scarcely one per week of the fatalities, but it is significant that both in the capital and in provincial towns the number of accidents has shown a tendency to increase since the military authorities insisted upon tramcars at last being brought under the regulation requiring a light to be shown on each side. Already in coroners' courts fault has been found with this alteration, and this week a London jury recommended a return to the large but well shaded headlight, while the Mexborough coroner has commented upon the unreasonableness of the change that has been made. The change is, in fact, a blunder, and it adds to the danger of the public. The credit for the decrease of accidents resulting from omnibus traffic in London during the past four years is due to the admirable safety campaign conducted by the "General" Company in the training of their own employees and in arousing the public to greater carefulness by advertisements. The time has now arrived when the efforts of the Company ought to be seconded by a publicly-managed propaganda, and judging by the support given to the Caxton Hall conference yesterday by representatives of all the interests concerned in the use of the streets, the efforts of the management in that direction are likely to be crowned with success. An outline of the work proposed for the London "Safety First" Council, which was formed at the conference, was given in our last week's issue, and now that the matter has been constituted a public one we have confidence that before long efforts on similar lines will be instituted in the provinces. In the inauguration of that work tramway authorities and watch committees might take the initiative. Wherever automobile clubs exist they should be invited to become one of the sponsors of the movement, for one of the objects of their existence during the past decade has been to promote considerate driving, with a view to gaining an increase in the maximum speed limit in open country. That increase has been more or less conceded in some parts of the country by the blindness of the police to the speed of motor vehicles engaged in national work, and it cannót be doubted that the services of motorists in the war will later on ensure the needed modification of the Motor Car Act. Motoring organisations should therefore be found very willing to take a share in the work of educating the public in safety matters. One question which "safety" councils ought to force to the front is the necessity of ensuring that every person in charge of a vehicle of any description possesses a knowledge of the rules of the road. Ignorance upon that subject has been the cause of innumerable accidents, and the lack of such knowledge ought to be a disqualification for obtaining a motor driving licence.

SPECIAL CAR TRAFFIC MAY BE PROHIBITED.

The "London Gazette" of November 24 contained the following addition to the Regulations made under the Defence of the Realm Act:—

RAILWAYS AND TRAMWAYS.

"9F.—(1) The Board of Trade, or, in Ireland, the Chief Secretary, may by order prohibit on any railways (including tramways) any traffic named in the order, being excursion traffic or traffic for special purposes, and the provision of any special facilities for any such traffic.

"If any person, in respect of any traffic so prohibited, acts in contravention of any such order, he shall be guilty of a summary offence against these regulations.

"(2) Any such order may be made so as to apply generally, or to any special railway, or any special traffic.

"(3) This regulation shall not apply to any railways over which his Majesty has control by virtue of a warrant under Section 16 of the Regulation of the Forces Act, 1871."

The Board of Trade on November 28 issued a communication in which they state that the increasing demands made by the war on the resources of the railway companies necessitate that every person who proposes to travel should consider whether it is really necessary that the journey should be undertaken. The Board desire to impress upon all traders the urgent importance of taking every step in their power to avoid delays to wagons, both in loading and unloading. The saving of a day all round means in effect a substantial addition to the rolling stock of the country. Economy and despatch in the use of sheets for covering wagons is also of great importance.

PERMANENT WAY MAINTENANCE.

It is impossible for any one to make even a cursory examination of the condition of tramway track throughout the country without being convinced that in efforts to economise sufficient importance has not been given to the necessity of maintaining tramway track in reasonable repair. In many places the condition of the track is now such that if considerable work is not done within a short time there will be great danger of the cars leaving the rails. When tracks fall into disrepair the deterioration increases rapidly, and it is poor economy to neglect the work until, in order to restore the track to a fair condition, radical reconstruction is necessary. Something might have been said for the postponement of repairs as long as it was reasonable to assume that the war would be concluded without much delay. It has become evident, however, that no one can set a date for the termination of hostilities, and it must be assumed that the war may possibly continue for at least another two years. Tramways services must, in the meantime, be maintained, and the wiser course is to deal promptly with such repairs as become necessary. The idea that materials will be obtainable at less cost at the termination of the war is quite likely to prove an utterly mistaken one, and it will probably be found economical to purchase the necessary materials for replacement and repair whenever they can be obtained, rather than to defer the work indefinitely in the hope that a cessation of the war will permit of the placing of contracts at more favourable rates. Tramway engineers and managers whose track is still in fair condition have only to consider the position of many of their neighbours to convince themselves of the wisdom of the above suggestions.

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EMPLOYEES' DEMANDS.

Sir George Askwith, Sir David Harrel, and Sir George Gibb, the Committee on Production, have made the following award on the application of the employees of the Birmingham Tramways, Gas, Electric Supply, and Water Departments: "The Committee have given careful consideration to the statements and arguments submitted to them by the parties, and their finding is that, as from the beginning of the first full pay day following the date of this award, the rates of wages of the workpeople concerned shall be advanced 2*s.* 6*d.* per week, the advance to be regarded as war wages, and recognised as due to and dependent on the existence of the abnormal conditions now prevailing in consequence of the war. This advance is to be applied in the same manner as the war wage of 2*s.* per week granted in February, 1916." The estimated annual cost of the 2*s.* 6*d.* advance now granted in the four certified departments is £43,000, which is equivalent to a rate of 2¼*d.* in the £. In addition to this the Labour Committee will now have to consider the application from the workmen in the employ of other labour-employing committees of the Corporation.

The arbitrator appointed to consider the application made by the tramway employees of Sunderland Corporation for an increase of wages has made the following award: "That as from October 1, 1916, in lieu of the present war wages a war wage of 6*s.* per week be paid to all adult employees, that is to say, conductors (both male and female), motormen, cleaners, trackmen, and handymen, and high and low shed men, and a war wage of 3*s.* 6*d.* per week to all point boys and shed lads. Any payments in respect of the hitherto existing war wages of 3*s.* 6*d.* per week to males and 2*s.* a week to females and boys to be regarded as in part-payment of the war wages hereby awarded, and be accounted for accordingly. The war wages hereby awarded are to be regarded as war wages, and recognised as due to and dependent on the existence of the abnormal conditions now prevailing in consequence of the war."

Applications for advances of wages having been received from several sections of tramway workers Bradford Tramways Committee have appointed a sub-committee to meet the various bodies concerned for purposes of negotiations.

Rawtenstall Council have granted their tramway drivers and conductors an extra halfpenny per hour in wages, in addition to the present war bonus of a halfpenny per hour. The depot men have been similarly dealt with.

Preston Tramways Committee have agreed to refer to the Committee on Production the application of their employees for increased wages.

L.C.C. TRAMWAY MATTERS.

At the fortnightly meeting of the London County Council the Highways Committee reported that proceedings had been taken against four persons for obstructing tramway cars, with the result that fines were imposed in three cases. Two persons were fined for avoiding payment of fares, and one person for allowing a defective vehicle to break down on the tramway track. Two persons were fined and one man was sentenced to six weeks' imprisonment for assaulting tramway employees. In a case of assault on a woman conductor a man was sentenced to one month's imprisonment with hard labour.

TRAMWAY SERVICE IN DENSE FOG.

One of the densest fogs experienced in recent years prevailed in London on Monday evening, November 13. A great deal of traffic was brought to a standstill, and the reduced lighting contributed in no small measure to the difficulties of traffic. The Highways Committee reported that the car services were well maintained, the tramcars, owing to the certainty of their route and direction, having fewer difficulties to contend with when fog prevails than other forms of road traffic. The Committee had no doubt that the way in which the service was maintained was of great advantage to the public, many of whom but for the tramways would have experienced great delay.

TENDERS FOR TROLLEY WIRE.

On the recommendation of the Highways Committee it was decided to invite tenders from selected firms for the purchase of about 3,000 yards of trolley wire required for renewal purposes.

STOCK OF TRAMWAY STORES.

The value of the stores in the tramway department at March 31, 1916, amounted to £198,611, representing an increase of £48,611 over the amount (£150,000) voted under standing order No. 217. The Highways Committee reported that the excess was due to a variety of causes but mainly to the increased prices of materials, particularly metals and timber, and to other conditions arising out of the war. In view of the extent (147 route miles) of the Council's tramways and of the necessity for providing parts and equipment for two systems of electric traction, the Committee do not anticipate that any reduction can be made at present in the value of the stock of stores, and they recommend that the amount to be voted under the standing order should be increased to £220,000, which was agreed to.

WOMEN CONDUCTORS' UNIFORMS.

Mr. J. D. GILBERT asked if arrangements could be made to supply conductresses with winter overcoats. Mr. G. H. Hume (chairman of the Highways Committee) gave particulars of the uniforms supplied, and said that as no application had been made for additional uniform, that provided was regarded as adequate.

NON-PAYMENT OF FARES.

Mr. T. GAUTREY questioned whether the traffic returns could be regarded as quite satisfactory, especially in view of the present increased user of the cars. There was a considerable proportion of missed fares, though through no fault of the female conductors, because it was physically impossible during the rush hours night and morning for any one official to collect them. He advocated an invitation to the general public to co-operate and increased activity in prosecuting those passengers who deliberately manœuvred to avoid payment. Automatic fare collecting boxes might be a success.

Mr. G. H. HUME said that the Highways Committee welcomed all friendly suggestions. The question of fare collection was being closely watched, and arrangements would be made to quickly publish in the cars convictions of passengers deliberately evading payment. The idea that there was a tremendous amount of wastage was not supported by the observations which had been kept from day to day; but he was glad the question had been raised, for that gave him an opportunity of joining in the cordial invitation to the public to co-operate in these difficult times. As full a service on all routes was maintained as the men at their disposal permitted.

MISCELLANEOUS NEWS AND NOTES.

The Southampton Generating Station. The Electricity Committee have authorised the electrical engineer to prepare a scheme for increasing the boiler installation.

A Bolt Suspends Tramway Traffic. Owing to a stray bolt becoming wedged in the tramway points at Babington Lane, the service of cars was recently held up for an hour in Derby.

Swansea Tramway Service. The Watch Committee, after a discussion on the tramways service provided by the company, have appointed a Tramways Committee with full powers to deal with all matters connected with the subject.

Edinburgh Cable System. In view of the satisfactory progress in the repair of the tracks and cars of the Edinburgh tramways, the Magistrates have renewed the license to the company to continue the running of the system.

Request for Women Tramcar Drivers in London.—Walthamstow Council have asked the Home Office to sanction the employment of women as tramcar drivers owing to the increased scarcity of men suitable for training as motormen.

Fined for Taking Away a Car Employee.—Paisley and District Tramways Company on November 23 complained to the General Munitions Tribunal that a firm of paper makers had employed one of the company's workmen who had not received a clearance certificate from them. The respondents explained that they were ignorant of the provisions of the Munitions Act. A fine of £10 10*s.* was imposed.

Christmas Day Holiday. Bradford Tramways Committee have decided to suspend the tramways service on Christmas Day, as was done last year. At Preston the service will be suspended, but the committee have informed the men's union that they cannot agree to wages being paid. Swansea Labour Association are supporting a movement inaugurated by the tramways employees for a general holiday.

Contract Tickets at Blackpool. In his annual report on the tramways undertaking, the general manager expresses regret that after consideration of lengthy reports and recommendations on the subject of annual contract tickets, no definite decision to revise the conditions was arrived at, the matter being deferred until after the war. In 1911 the number issued was 922, and the revenue £2,516. In 1915-16 the figures were 1,482 and £4,241.

Sale of Used Tickets. As the result of placing used ticket boxes on the Bradford tramcars, the department recovers about 12 tons of tickets annually, and disposes of them at the rate of £2 per ton. The Corporation are now obtaining £9 per ton for old papers, account books, etc., which they formerly had to pay 30*s.* a ton to have taken away. The recovery of marketable constituents from the city's sewage is producing over £60,000 a year.

Rail Traffic and Air Raids. Replying to a letter received from Southwark Borough Council as to railway and tramway traffic during air raids, the General Officer Commanding the London District states that only such lights are permitted on railways and tramways as are absolutely necessary to ensure the continuance of traffic which is of the greatest national importance. Observation has shown that sparking from electric trains and tramcars tends rather to confuse than to assist hostile aircraft in finding their way.

Restricted Services.—As the result of a conference of the chairman, vice-chairman and general manager of Newcastle Tramways with the managers of the local places of amusement, it is said to be assured that within a week or two the last cars will leave the centre of the city about 10 p.m. Preston Tramways Committee have ordered that the last cars leave Lancaster Road at 10.30 p.m., and the manager will make arrangements for conveyance to their homes of women conductors who are on the last long turn.

Loss Entailed by Decreased Speed at Portsmouth.—When an order was issued at Portsmouth for the speed of all vehicles to be reduced after sunset to eight miles an hour, the Tramways Committee as an additional precaution decided to reduce the average speed of the cars to 6.45 miles per hour. Consequently more cars had to be placed in service, but as there has not been a compensating addition to the revenue, it is estimated that at the end of the financial year on March 31 next there will be a loss of £4,176 to set against the amount voted for the relief of the rates.

Government Control of Munition Electric Supply Stations.—In order to comply with a request for a restricted tramcar service between meal times, when, owing to the breakdown at the electric supply station, no cars are run at Birmingham, the Electricity Committee have applied to the Ministry of Munitions to permit the supply of energy. To enable this to be done a limited number of munition factories would be required to work at night instead of during the day. It is anticipated that the new 6,000 kw. turbine and generator will be installed by the middle of December.

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Contributory Negligence in Trolley Reversing.—A Walsall car conductor claimed £50 damages in the County Court from a motor-cab proprietor for personal injuries and damage to clothing sustained through being struck in the back by a cab while he was standing in the gutter to reverse the trolley-arm with a pole. The defence was that it was "plaintiff's fault if he was sauntering across the road without taking care." In dismissing the action the Judge held that there had been no negligence on the part of the driver. Even had there been negligence he should hold that there was contributory negligence on the part of plaintiff.

Omnibus Conductor's Action Against Leyton Council.—A claim for damages was brought at Shoreditch County Court by an omnibus conductor against Leyton Urban Council for injuries and loss of wages sustained through a tramcar running into the back of his omnibus with such force that the staircase was forced into the omnibus. The defence was that the omnibus had been trying to get past some slow traffic, but failed, ran on to the lines, and stopped dead, the car being unable to pull up before the crash. The jury awarded £10 for loss of wages and £15 for personal injuries, £25 in all, and judgment was entered accordingly.

Birmingham Tramway Stoppages.—The Electric Supply Department have not yet received any communication from the Ministry of Munitions in reply to their proposal to provide sufficient energy to enable the Tramway Department to run a modified service throughout the day. The city electrical engineer (Mr. R. A. Chattock) is, however, arranging for an early interview with the representatives of the Ministry. The present situation, in which the service is interrupted daily sometimes for several hours, is becoming intolerable. The Tramway Department is entirely dependent on the Electric Supply Department, and is powerless to improve matters.

Special Constables and Tramcar Rides.—On the withdrawal of free riding facilities to the London special constabulary, the County Council have arranged to supply tokens at face value to the police authorities, who will issue the same for distribution. This arrangement follows that made with several large employers of labour, and entails no loss of revenue to the council. Bournemouth Council have refused a request for the extension of free travelling facilities on the tramcars to special constables, while the Brighton Watch Committee have agreed to pay £50 per annum for special constables in uniform to ride free of charge when proceeding to and returning from duty.

Employees Retained until Substitutes are Available.—In applying to the Preston Tribunal for the exemption of ten motormen, ages ranging from 27 to 34, Mr. J. F. Simpson, general manager of the Corporation Tramways, said he understood the military were prepared to provide substitutes. He asked to be allowed to retain the men until substitutes were forthcoming, as if they were taken nine cars would have to be withdrawn. During the past three months the labour exchange had sent him only one man. The military representative accepted the condition, and the men were exempted until February 1, the men to go in the meantime if substitutes were available.

Value of Tramway Association Work.—Mr. Peter Fisher, general manager, Dundee Corporation Tramways, at a meeting of the Tramways Committee on November 20, observed that at the Council meeting a member had asked whether he attended the meetings of the Municipal Tramways Association at the Council's expense. Mr. Fisher said he attended the conferences at great inconvenience and almost suffering, because he detested travelling, but he went because he considered he was doing valuable and important work as part of his duty. Mr. G. A. Johnston, chairman of the Committee, said that from experience he knew that what Mr. Fisher had said was correct. Mr. Fisher as ex-president is a member of the Executive for another three years, and the Tramway Committee unanimously agreed that he should attend their meetings.

Private Bill Notices.—In addition to the Bill promoted by the Mynggdialwyn Urban Council to empower them to provide and run omnibuses worked by mechanical or horse power in that district, and also by consent in Abercarn, Risca, and Bedwellty, notices of their intention to apply for similar powers have been lodged by the Caerphilly Urban Council and the Bedwas and Machen Urban Council. The latter Bills relate to a joint scheme, and power is also asked to allow the two Councils to enter into agreements with reference to the working, running and leasing with any authorities, companies or persons running omnibuses in any district in Monmouthshire and Glamorgan. The respective Parliamentary agents to the two Councils are Messrs. Rees and Freres, 5, Victoria Street, and Messrs. Lees and Co., Palace Chambers, Bridge Street, Westminster.

Tilling, Ltd., to Control Brighton Omnibus Service.—After a year or more of conflict and negotiation, Messrs. Tilling, Ltd., have made arrangements with the Brighton and Hove Corporations to take over the whole of the motor omnibus services in the two towns. Hove Council had all along allowed the company to run their services, but the Brighton Council refused to allow the vehicles to take up passengers in their area. In agreeing to the transfer of the licences of the Brighton and Hove Omnibus Company to Messrs. Tilling, the Corporation have reserved their full rights under the Acts of 1903 and 1912 (the latter sanctioning railless traction and the running of motor omnibuses), and also such rights as may be acquired under the Provisional Order now being promoted. Consideration of a proposal by Messrs. Tilling to run a number of new services has been deferred until December 21.

A Trailer Accident.—An inquest was held on November 27 by the City of London Coroner with reference to the death of a man who was killed at the Blackfriars tramway shelter. The evidence showed that at 8 p.m. on November 27 the deceased was in the queue when a Norbury car with a trailer came along, and before it stopped the man rushed past the regulator and attempted to board the vehicle. He slipped, and falling between the kerb and the trailer, was crushed. In returning a verdict of accidental death the jury found that no one was to blame. There is a simple explanation for the occurrence that does not seem to have been put forward at the inquest. The Norbury cars draw up at the extreme east end of the shelter, and passengers, after passing the regulator, have to walk half a dozen steps to the car. Deceased had recently come to live in London from Worthing, and he might have been under the impression that the car was not going to stop.

Recognition of Inspectors' Extra Work.—York Corporation have granted the tramway inspectors an increase of 5s. per week in their wages. Councillor W. H. Sessions, in moving this payment, mentioned that the inspectors had deferred the application for a year at the Committee's request, and in addition they had had their work increased by the training of 157 new drivers and conductors since the war began. As to the point previously raised about an excessive number of inspectors, it had been ascertained that whereas in other towns of corresponding size there was one inspector to about eight conductors, York had only one inspector to ten conductors. In commending the work of Mr. J. W. Hame, the manager and engineer, the chairman of the committee said he had had a great deal to contend with. A new branch had been opened to Hull Road, and a motor omnibus service inaugurated in addition to the old service, to staff which they had to train new employees. Of 105 drivers and conductors at present employed only 16 were old employees.

Women Conductors and the Sand Pedal.—The Bradford Coroner held an inquiry on November 21 into the death of a woman who was injured in jumping off a tramcar while it was running back about 150 yards. The motorman had stopped to pick up a passenger in a loop, and on reaching the single line he saw a car coming. He therefore backed into the loop. After going about two car lengths the wheels began to slip, and he applied the hand-brake, afterwards using the electric brake. He then called to the conductor for sand, and when he found the sand was not falling he went to the other platform and worked the pedal himself. As soon as the sand began to fall the car stopped. The woman conductor of the car stated that she called to the passengers to keep their seats, and at once put her foot on the lever, which she thought was working. The deceased followed the driver to the platform and jumped off. In reply to questions the conductor said she was only shown once on the learners' car how to apply sand, but she knew what to do when the driver called for sand. The jury returned a verdict of accidental death. Mr. E. Priestley, chairman of the Tramways Committee, and Mr. C. J. Spencer, general manager, attended the inquest.

Irregularity of Services.—It is perhaps only natural that the public should complain of the diminution and occasional irregularity of tramway services. They have for so long been accustomed to have their convenience studied in every way that any suggestion that they should alter their habits is at first blush resented. Local newspapers are consequently filled with letters to the editor complaining of facts which are indisputable, but which are nevertheless inevitable, in view of the national demands that are being made upon labour. These complaints are no doubt irritating to tramway managers; but it occurs to us that they might stem the flow of irresponsible criticism by enlisting the sympathies of the editors of local newspapers, who by judicious comment from time to time could give the travelling public some insight into the difficulties with which tramway managers have to cope. Following the example of the National Government, there has been a tendency on the part of local authorities to refrain from making known the plain facts of the situation to the public. The people have, however, the will to win this war, and they are perfectly prepared to sacrifice their own convenience and ease to a much greater extent than they have hitherto done. In fact, if the circumstances required it, there is no doubt that tramway managers might derive much greater assistance from the public in the actual operation of the cars than has hitherto been given. All that is required is to place the conditions clearly before the people. To expect them to understand these circumstances without advice from those in positions of authority is to demand altogether too much. The responsibility rests upon town councillors to make an unreserved statement of their difficulties. If they do not and fault is found with the tramway services, they have only themselves to blame.

PERSONAL.

Mr. F. Golding, assistant electrical engineer to the Commonwealth Postmaster-General, has been appointed electrical engineer for Victoria, in succession to Mr. A. A. Dircks, who has become electrical engineer of New South Wales.

Regimental-Sergeant-Major J. R. Jones, London Battalion, Royal Welsh Fusiliers, has won the Military Cross for gallantry under shell fire on several occasions. He was formerly a motorman at West Ham, and his former comrades have presented him with a silver tea service. Mr. L. Slattery, the general manager, made the presentation.

Sergeant T. Jones, 2nd Welsh Regiment, for many years a Cardiff Corporation tramway employee, has gained the Military Medal and a bar for gallant conduct in continuing an assault and also for bringing in the wounded. The decorations were presented to him by the Lord Mayor at a meeting of the City Council, and on November 17 the gallant sergeant's former fellow employees entertained him at a smoking concert. Mr. A. Ellis, the general manager, presided, and on behalf of the employees, presented Sergeant Jones with a silver epergne.

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CONTRACTS AND ORDERS.

Sheffield Tramways Committee have placed a contract with Messrs. Meade-King, Robinson & Co., for the supply of motor spirit for the omnibus department.

Johannesburg Council have placed the following contracts:—10,000 lb. copper wire, and 10 miles of underwriters' wire, Telegraph Manufacturing Company, Ltd., Helsby; 10,000 Edison metal filament traction lamps, Griffin Engineering Company, Bath; six 150 k.v.a. transformers, Sykes and Company.

FINANCIAL REPORTS AND MEETINGS.

Electric Construction Company.—The directors have declared an interim dividend at the rate of 7 per cent. per annum on the preference shares.

British Electric Traction Company.—The directors have declared the dividend on the 6 per cent. cumulative participating preference stock for the half-year ended September 30.

L.C.C. Tramway Receipts.—The traffic receipts for the two weeks ended November 15, 1916, were £93,005, an increase of £4,709 as compared with the corresponding period last year. The number of passengers was 22,490,940, an increase of 1,462,619. From April 1 to November 15 (thirty-two and a half weeks) the total receipts were £1,596,652, an increase of £152,038 on the corresponding period of 1915. The route mileage was 141.67.

East India Tramways. For the year ended July 31 last the gross receipts were £17,104, and the working expenses £19,408, making net receipts £7,696. Four hundred pounds has been placed to reserve. There is a balance available for dividend of £7,400. The directors recommend a 5 per cent. dividend on the cumulative preference and ordinary shares, of which an interim dividend of 2½ per cent. was paid May 31 last, and 10 per cent. on the preferred shares, leaving £354 to be carried forward.

Blackpool Corporation Tramways.—In his annual report, Mr. C. Furness, general manager, states that the gross profit of £35,020 was divided as follows:—Interest and sinking fund, £18,700; reserve fund, £3,275; permanent way renewal fund, £8,000; relief of rates, £5,000. The net profit constituted the third best in the history of the department. The receipts were £3,601 more than the previous year, though up to the end of September the increase only stood at £849. The winter months brought an approximate increase of £2,600. Appended is a statement compiled from the returns for the past three years:—

	1915-16.	1914-15.	1913-14.
Capital expenditure ..	£317,088	£316,005	£310,994
Amount outstanding ..	£313,888	£316,005	£310,994
Traffic revenue.	£78,825	£75,344	£84,034
Total revenue	£80,066	£76,105	£84,797
Working expenses	£43,471	£44,527	£43,486
War Allowances	£1,559	£323	—
Gross balance	£35,036	£31,255	£41,311
Net profit	£16,275	£13,736	£14,553
Passengers carried ..	14,585,851	13,624,514	14,289,802
Fare per passenger ..	1.30*d.*	1.32*d.*	1.41*d.*
Car mileage	1,069,524	1,085,056	1,075,943
Units per car mile ..	1.55	1.43	1.40
Power cost per car mile	2.39*d.*	2.26*d.*	2.29*d.*
Traffic receipts per track mile	£4,504	£4,370	£4,524
Traffic receipts per car mile	17.69*d.*	16.82*d.*	18.74*d.*
Expenses per car mile ..	9.76*d.*	9.84*d.*	9.69*d.*
Ratio of working expenses	56.24	58.93	51.28
Total track mileage ..	21 mi. 51 ch.	21 mi. 51 ch.	21 mi. 33 ch.
Number of cars in stock	84	84	78

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty four o, the principal tramway undertakings in the United Kingdom for the week ended November 18 give total receipts of £177,149, or £19,734 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or sixty-six more than for the corresponding week. The receipts this year were at the rate of £79 8s. 9*d.* per mile of single track, and last year at the rate of £72 15s. 6*d.*, thus showing an increase for the week of £6 13s. 3*d.* per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

DICK, KERR & Co.,

Limited,

ABCHURCH YARD, CANNON STREET, LONDON, E.C.

ENGINEERS & CONTRACTORS.

Complete Equipment

TRAMWAYS & LIGHT RAILWAYS

at home and abroad.

TRAMWAY CHAIRMEN FOR 1916-17.

Municipal Tramways Committees have now been constituted for the ensuing year, and we append a list of the chairmen and the vice-chairmen. An asterisk indicates that a new chairman or vice-chairman has been appointed.

Town.	Chairman.	Vice-Chairman.
Aberdare ..	Coun. E. Stonelake ..	
Accrington ..	Ald. Higham ..	Coun. Morley.
Ayr	Coun. J. R. Learmont	
Bacup ..	Ald. Sir H. Maden (Mayor)	Coun. J. H. Lord.
Barking ..	Coun. D. Gordon ..	
Batley ..	*Coun. F. W. H. Auty	*Coun. J. E. Oldroyd.
Belfast ..	Coun. J. McCaughey	Coun. J. Warwick
Bexley ..	*Coun. G. Sheldon ..	
Birkenhead ..	Coun. H. Halsall ..	Coun. R. Frame.
Birmingham ..	Coun. H. Barrow ..	*Coun. Fryer.
Blackburn ..	Ald. W. Thompson ..	Coun. C. Higham.
Blackpool ..	Ald. Brodie	Coun. Holt (Deputy Mayor).
Bolton ..	Ald. J. Miles ..	Coun. P. Higson.
Bradford ..	Coun. E. Priestley ..	*Coun. I. F. Akeroyd.
Brighton ..	Coun. A. Martin ..	
Burnley ..	Coun. E. Heap ..	Coun. Irving.
Burton-on-Trent	Ald. Rowland (Deputy Mayor)	*Ald. Medcalfe.
Bury	Ald. Collinge ..	Coun. Hargreaves.
Cardiff ..	Ald. Sir J. W. Courtis (Deputy Mayor)	Coun. A. J. A. Stone.
Chesterfield ..	Ald. E. Shentall ..	Coun. Woodhead.
Coventry ..	Coun. Pugh ..	Coun. Wale.
Croydon ..	Ald. Allen	Coun. Thomson.
Darlington ..	Ald. C. W. Starmer.	
Dartford ..	Coun. R. Bennett ..	*Coun. W. H. D. King.
Derby ..	Coun. Dean ..	
Doncaster ..	*Coun. S. Balmforth	*Coun. H. M. Marshall.
Dover	Coun. Barwick ..	Coun. Norman.
Dundee ..	Coun. Johnston ..	
East Ham ..	Ald. M. Oakes ..	
Eccles ..	*Coun. Alexander ..	*Ald. Pearson.
Erith	Coun. G. C. Humphreys	
Farnworth ..	Coun. Steele.	
Glasgow ..	Coun. M.W.Montgomery	Bailie T. Kelly.
Gloucester ..	Coun. J. O. Roberts	Coun. C. J. Ramstedt.
Halifax ..	Ald. C. F. Spencer ..	Ald. A. Fawcett.
Heywood ..	Coun. J. Ashworth ..	Ald. Popple.
Huddersfield ..	Coun. E. H. Sellers ..	Coun. T. Canby.
Hull	Coun. W. Wheatley	Coun. W. Hakes.
Ilford	*Coun. O. Waters ..	*Coun. J. Lowe.
Keighley ..	Coun. A. Smith	
Kilmarnock ..	*Coun. Lorimer	
Lancaster ..	Coun. Wilkinson	
Leeds	Ald. R. A. Smithson	Ald. H. Brown.
Leicester ..	Ald. Flint	Ald. Banton.
Leith	Judge Hall.	
Leyton ..	Coun. F. M. Read	
Lincoln ..	Ald. W. S. White.	
Liverpool ..	Coun. E. Russell-Taylor	Ald. F. Smith.
Lowestoft ..	Coun. Spashett (Mayor)	
Maidstone ..	Coun. Lyle ..	Coun. Green.
Manchester ..	Ald. J. Bowes ..	Ald. A. W. Chapman.
Middlesex C.C.	Ald. H. Burt.	
Nelson ..	Coun. Cooke.	
Newcastle-on-Tyne ..	Coun. R. Mayne ..	Coun. A. M. Sutherland.
Newport ..	Coun. J. Moxon ..	Ald. F. Phillips.
Northampton	Coun. T. D. Lewis ..	Coun. W. Beale.
Nottingham ..	Coun. R. H. Swain ..	Ald. Radford.
Oldham ..	*Coun. Cheetham ..	*Coun. Stanbury.
Perth	Coun. Calderwood.	
Plymouth ..	Ald. S. H. Phillips ..	Coun. J. Moon.
Pontypridd ..	Coun. M. L. Jones	
Portsmouth ..	Coun. J. Timpson	Ald. R. Payne.
Preston ..	Ald. J. Ormrod ..	Coun. T. Parkinson.
Rawtenstall ..	Ald. H. Coupe ..	Coun. J. W. Stansfield.
Reading ..	Ald. Field.	
Rochdale ..	Ald. Taylor.	
Rotherham ..	Ald. Winter ..	Coun Reeves.
Salford ..	Ald. H. Linsley ..	Coun. W. H. Barrett.
Sheffield ..	Ald. Sir W. Clegg ..	*Ald. W. C. Fenton.
Shipley ..	Coun. H. Pitts.	
Southampton	Ald. Dunsford.	
Southend ..	*Coun. G. Radford.	
Southport ..	Ald. Griffiths ..	Coun. Clayton.
Wallasey ..	Coun. F. E. Howse	Coun. Griffin.
Walsall ..	Ald. Cope	Ald. Williams.
Walthamstow	Coun. W. R. Clarke	
Warrington ..	Coun. Dr. Joseph ..	Coun. Wilkinson.
West Ham ..	Coun. Kensett.	
West Hartlepool	Ald. Martin ..	Coun. Charlton.
Wigan ..	Ald. R. T. Fletcher	Coun. J. Walkden.
Wolverhampton	Ald. Sir C. T. Mander.	
York	Ald. Meyer	Coun. Sessions.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Last.	Name.	Paid.	Price, July 27 1914	Cash. Nov. 30	A Week Ago.
5%	5%	Alabama Traction. 5% 1st. Mt.	—	67	78¼	79½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4¼	62/6	64/4½
4%	4%	Do. 4% Deb. ...	100	91	66½	67
4½%	4½%	Do. 4½% Deb. ...	100	98½	74½	75
5%	5%	Do. 5% Deb. ...	100	96	64*xd*	67½
1/-	7d	Auckland Elec. Trams. Ord. ...	1	1	21/-*xd*	21/-*xd*
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	93¾	93¾
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11½	10½	10⅜
4½%	4½%	Do. 4½% Deb....	100	96	82½	83
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	91½	91½
$1	$1	Brazilian Trac. & Power Ord. ...	$100	66	49¾	50½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	90	91
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6¾	6¾
2/6	2/6	Do. 5% Cum. Pref.	5	5	85/-	85/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	46	58¼
6%	5%	Do. Pref. Ord....	100	106	48	48
5%	5%	Do. 5% Cum. Pref.	100	103	67½	68¾
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	88⅜	88⅜
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	60⅜	60⅜
—	—	Brit. Elec. Trac. Ord.	100	—	34¼	34
—	6%	Do. 6% Cum. Part Pref. ...	100	—	77	77½
5%	5%	Do. 5% Deb.	100	92	80	82½
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	69½	69½
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	79½	81½
3/-	6/6	Calcutta Tramways, Ord. ...	5	7½	6½	6½
1/3	1/3	City of B.A. Trams.	5	5½	86/3	86/3
5/-	4/-	Dublin United Trys 6% Pref.	10	12	10½	10½
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79¾*xd*	79¾
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	27/6	27/6
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	½	2/1½	2/1½
6/-	6/6	Lanarkshire Trys. Co.	10	10½	9⅝	9⅝
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9⅜d.	9⅜d.*	Llandudno & Colwyn B. Ord. ...	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	15/64	2/3	2/3
6d.	6d.	Do. 5% Pref.	1	16/64	8/4½	8/3
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	66	64½
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88	88
5%	5%	Do. 5% Inc. Deb.	100	88½	78	79½
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	47½	47½
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	96/6	96/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	66¾	66¾
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	67½	68
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	74½	74½
$1½	$1½	Mexico Trams. Common ...	$100	70	27	27
5%	5%	Do. 1 Mt. 5% G.B.	—	8¼	30	30
6%	6%	Do. 6% Mt. Bds.	100	76	30	30
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95	95
1/-*	1/2½*	National Steam Car	1	15/16	20/-	19/10½
9⅜d.*	9⅜d.*	New General Traction	1	½	7/9½	7/9½
8⅜d.	6d.	Northern Gen. Trans. Ord. ...	1	8/16	14/-	14/-
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	68/-	68/-
5%	5%	Do. 5% 1st Deb.	100	89½	74½*xd*	74½*xd*
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80⅜	80⅜
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	15/16	11/4½	10/10½
10d.	8d.	Provincial Trams. Ord.	1	½	20/6*xd*	20/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	84	84
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	92½	91⅝
5%	5%	1st. Mt. 5% 50 yr.	100	89½	75½	76
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	90¾	90¾
5%	5%	Do. 5% Perp. Deb.	100	99½	77½	77½
—	—	Singapore Elec. Trams	5/-	½	4/10½	4/10½
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	94	96½
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	81	81
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	98	97½
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	77	77
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	¼	9/3	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4½	95/-	95/-
—	—	Metropolitan Dist. Ord. ...	100	21¾	15¾	16½
—	—	Undgd. Elec. Rys. of London ...	10	2½	40/-	40/-
		Do. "A"	1/-	⅜	6/-	6/7½
4½	4½	Do. 4½% Bds of 1933 Rd.	—	99	101½	102
6	6	Do. 6% 1st Cum. In. Db.	100	114	101½	102
6	6	Do. 6% In. Bonds Rd. ...	—	88	91½	91½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1915	1916	Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	Nov. 25	£52,407	£52,241	48	£2,401,981	+ £4,896
Auckland	(28 days) Oct. 20	20,831	21,428	16	84,286	+ 1,160
Ballarat and Bendigo	Oct. 8	3,401	3,390	28	22,110	+ 600
Brazilian Traction	Mlrs. Oct.	6,793,000	7,037,000	44	68,286,000	+ 4,035,890
Brisbane	Oct.	31,880	32,760	44	330,420	+ 23,466
British Columbia	$ Sept.	517,022	540,440	13	1,629,026	+ 94,155
Buenos Aires Lacroze	Oct. 4	42,516	39,670	17	151,615	+ 13,184
Burmah Tramway	Rs. Sept.	22,163	23,749	9	48,161	— 839
Calcutta	Rs. Nov. 25	69,691	71,206	48	3,203,718	+ 171,557
Cape Town	Oct.	...	14,238	...	...	...
Carthagena & Herrerias	Oct.	2,169	2,539	44	25,139	+ 7,390
Cordoba	Sept.	13,210	13,389	26	84,554	+ 648
Costa Rica	July	3,046	3,223	...	...	...
East India	Oct.	2,069	2,080	13	7,125	+ 736
Hong Kong	$ Oct. 28	10,804	12,398	46	623,225	+ 149,607
Kalgoorlie	Sept.	2,997	2,788	39	23,267	— 1,849
La Plata	Oct.	4,405	4,435	44	42,057	— 227
Lima	Sept.	30,530	33,348	39	304,058	+ 15,777
Lisbon	Escu. Sept.	...	194,276	...	...	...
Madras	(2 weeks) Nov. 15	29,441	31,596	45	665,506	+ 47,182
Manila	July	23,750	33,700	31	887,739	+ 39,986
Manaos	Rs. Sept.	...	141,286	...	...	...
Melbourne	May	...	69,275	...	...	...
Montevideo	Sept.	25,070	26,711	48	319,043	+ 15,626
Pernambuco	Nov. 19	3,283	3,555	46½	141,047	— 1,018
Peruvian	$ Oct.	806,900	945,590	18	3,588,830	+ 482,773
Port Elizabeth	Oct.	...	3,131	...	...	...
Rangoon	Oct.	4,886	5,043	44	46,371	— 1,844
Shanghai	$ Oct. 25	24,501	31,704	...	...	...
Singapore	$ Oct. 21	12,218	12,463	41	530,210	+ 54,820
Toronto	$ Sept.	804,902	913,535	39	8,005,764	+ 855,159
Winnipeg	Sept.	261,982	267,497	39	2,461,454	— 51,995

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	1916	Incr. or Dec.	Aggregate. Wks.	1916	Incr. or Dec.
Aberdare U.D.C.	Nov. 21	£339	£363	+ 24	34	£13,518	+ £1,543
Aberdeen Corporation	,, 22	1,573	1,770	+ 197	29	48,675	+ 2,881
Accrington Corp.	,, 15	504	550	+ 46	33	19,376	+ 794
Ayr Corporation	,, 25	224	262	+ 38	28	12,976	+ 1,148
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	,, 26	1,232	1,514	+ 282	34½	53,405	+ 5,664
Birmingham Corp.	,, 25	14,752	12,675	— 2,077	34	550,554	+ 60,733
Do. Motor Omnibuses	,, 25	768	1,069	+ 301	34	34,548	+ 4,939
Blackburn Corp.	,, 22	1,004	1,021	+ 17	34⅔	44,120	— 981
Blackpool & Fleetwood.	,, 25	247	284	+ 37	47	42,411	+ 4,869
Blackpool Corp.	*	...	...	...	...	...	...
Bolton Corporation	,, 26	2,402	2,702	+ 300	35	100,982	+ 7,321
Bournemouth Corp.	,, 29	1,587	1,891	+ 304	35	83,146	+ 6,754
Bradford Corporation	,, 18	5,856	6,233	+ 407	33	229,815	+ 8,239
Brighton Corporation	,, 26	811	1,015	+ 204	34⅔	45,358	+ 4,965
Bristol	,, 24	9,634	9,351	— 283	47	474,995	+ 23,826
British Elec. Federa'n	*	...	...	...	...	...	...
Burnley Corporation	,, 25	1,404	1,523	+ 119	35	60,058	+ 3,503
Burton-on-Trent Corp.	,, 26	244	263	+ 19	34	2,589	— 474
Bury Corporation	,, 26	1,097	1,223	+ 126	34⅔	50,112	+ 2,450
Cardiff Corporation	,, 18	2,392	2,858	+ 466	33	101,375	+ 10,034
Chatham & District	,, 23	970	1,049	+ 79	47	58,061	+ 3,181
Chesterfield Corp.	,, 23	249	232	— 17	34	9,585	+ 278
Colne Corporation	,, 25	210	240	+ 30	...	...	...
Cork Electric	,, 23	425	457	+ 32	47	24,092	+ 453
Croydon Corporation	*	...	...	...	...	...	...
Derby Corporation	,, 25	917	1,008	+ 91	34½	39,435	+ 2,919
Dover Corporation	*	...	...	...	...	...	...
Dublin & Lucan	,, 24	99	110	+ 11	21	3,566	+ 291
Dublin United	,, 24	5,351	5,830	+ 479	47	286,584	+ 715
Dundee City	,, 22	1,231	1,326	+ 95	27⅔	38,582	+ 936
East Ham Corporation	,, 25	1,218	1,120	— 98	34½	45,215	+ 163
Exeter Corporation	,, 24	292	388	+ 96	34	14,061	+ 755
Glasgow Corporation	,, 25	20,261	23,246	+ 2,985	25⅔	599,699	+ 46,434
Glasgow Subway	,, 25	1,242	1,251	+ 9	47	54,139	+ 4,331
Glossop (U. Elec. Supp.)	,, 25	119	134	+ 15	48	6,688	+ 667
Halifax Corporation	,, 21	1,857	1,774	— 83	33½	77,055	+ 955
Do. Motor Omnibuses	,, 21	39	44	— 5	33½	1,696	— 19
Hastings & District	,, 24	674	728	+ 54	47	49,258	+ 3,175
Huddersfield Corp.	,, 25	2,357	2,512	+ 155	34	98,147	+ 8,441
Hull Corporation	,, 25	3,088	3,071	— 17	34	107,448	+ 1,873
Ilford U.D.C.	,, 18	574	587	+ 13	33	23,042	+ 1,246
Ilkeston Corporation	*	...	...	...	...	...	...
Ipswich Corporation	,, 25	434	395	— 39	34	18,150	— 1,096
Isle of Thanet	,, 25	211	235	+ 24	8	2,269	+ 23
Kilmarnock Corp.	,, 25	143	171	+ 28	27⅔	4,934	+ 159
Lanarkshire	,, 23	1 803	2,167	+ 364	47	109,002	+ 15,808
Lancashire United	,, 22	1,501	1,667	+ 166	47	86,392	+ 4,876
Leeds City	,, 25	8,206	9,146	+ 940	35	339,700	+ 30,915
Leicester Corporation	*	...	...	...	...	...	...
Leith Corporation	,, 25	661	811	+ 150	27⅔	24,707	+ 3,117
Leyton U.D.C.	,, 23	1,426	1,351	— 75	34	57,297	+ 1,053
Liverpool Corporation	,, 25	12,383	13,676	+ 1,293	47½	666,257	+ 37,828
Llandudno & Colwyn B.	,, 24	171	199	+ 28	51½	18,610	+ 1,221
London County Council	,, 15	44,493	47,356	+ 2,863	32½	1,596,652	+ 152,038
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation	*	...	...	...	...	...	...
Maidstone Corporation	,, 23	168	176	+ 8	34	7,610	— 95
Manchester Corp.	,, 25	16,006	17,928	+ 1,922	32	650,074	+ 36,389
Met. Elec. Trys.	*	...	...	...	...	...	...
National Steam Car	*	...	...	...	...	...	...
Nelson Corporation	,, 11	187	185	— 2	32½	6,993	+ 538
N'castle-on-Tyne Corp.	,, 18	5,596	6,772	+ 1,176	33	224,167	+ 12,947
Newport (Mon.) Corp.	,, 25	735	970	+ 235	34	33 151	+ 4,031
New St. Helens & Dist.	,, 22	846	922	+ 76	21	24,408	+ 1,914
Northampton Corp.	,, 24	592	719	+ 127	34	24,595	— 768
Nottingham Corp.	,, 23	3,433	3,608	+ 175	34	134,804	+ 6,270
Oldham Corporation	,, 26	1,928	2,226	+ 298	35	87,683	+ 5,196
Portsmouth Corp.	,, 25	1,908	2,163	+ 255	...	...	...
Preston Corporation	,, 22	906	1,067	+ 161	33⅔	37,926	+ 4,850
Provincial	,, 25	1,877	1,866	— 11	8	16,864	+ 325
Reading Corporation	,, 23	679	801	+ 122	33⅔	29,604	+ 2,467
Rhondda Tramways	,, 16	1,186	1,301	+ 115	46	59,448	+ 5,200
Rochdale Corporation	,, 25	1,411	1,509	+ 98	34½	62,180	+ 2,458
Rotherham Corp.	,, 22	1,140	1,546	+ 406	33⅓	52,968	+ 13,354
Salford Corporation	,, 27	4.586	5,165	+ 579	33⅓	191.088	+ 9,309
Sheffield Corporation	,, 26	8,936	10,585	+ 1,649	35½	371,844	+ 56,898
Southampton Corp.	,, 22	1,277	1,512	+ 235	33⅓	57,554	+ 5,605
Southend-on-Sea Corp.	,, 29	532	643	+ 111	35	34 256	+ 4,067
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	,, 25	702	805	+ 103	34½	29,103	+ 1,527
Sunderland Corp.	,, 26	1,381	1,628	+ 247	34	56,921	+ 4,668
Sunderland District	,, 15	510	646	+ 136	3	1,936	+ 346
Swindon Corporation	,, 22	165	192	+ 27	33⅓	7,050	+ 290
Torquay Tramways	,, 16	386	480	+ 94	46	27,783	+ 2,297
Tyneside Trys. & Tmrds.	,, 15	495	617	+ 122	20	13,617	+ 1,140
Wallasey Corporation	,, 25	1,026	1,148	+ 122	30½	48,295	+ 3,114
Walsall Corporation	,, 25	730	747	+ 17	48	38,775	+ 3,442
Walthamstow U.D.C.	,, 25	696	912	+ 216	34	38,308	+ 6,653
Warrington Corp.	,, 9	462	522	+ 60	32	16,009	+ 1,342
West Ham Corporation	,, 23	2,778	2,781	+ 3	33⅓	110,645	+ 4,734
Wigan Corporation	,, 23	1,347	1,641	+ 295	34	57,730	+ 5,073
Yorkshire (W. Riding)	,, 26	1,419	1,675	+ 256	48	84,514	+ 8,752

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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

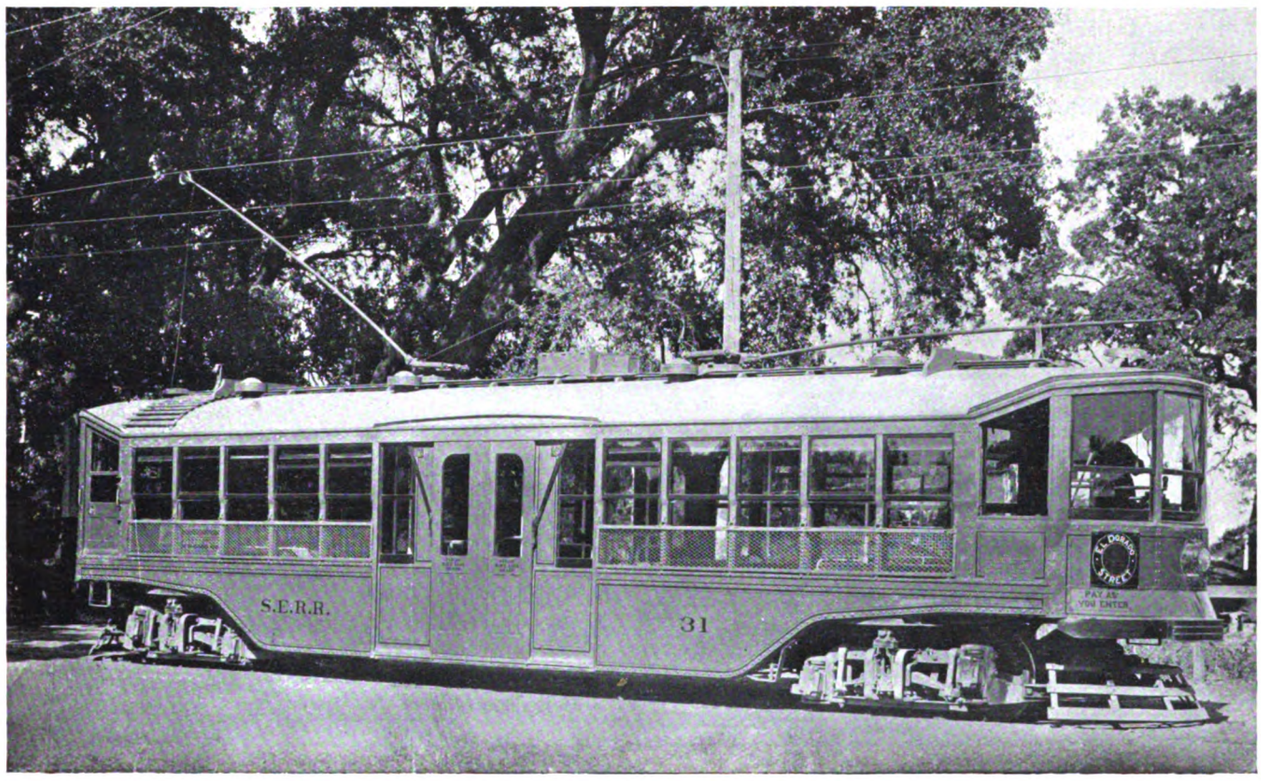
Founded 1892. LONDON, DECEMBER 7, 1916. VOL. XL.

CENTRE DOOR ELECTRIC CARS.

TYPES IN WESTERN AND EASTERN AMERICAN STATES.

For several years there has been notable activity among American tramway companies in the search for types of electric cars which most efficiently meet the various traffic conditions that are found in different localities. The car with centre doors has been found to possess certain advantages, and this arrangement, combined with a low entrance platform giving easy access, is now being largely adopted. As typical of the movement to which we refer two cars are illustrated in these notes; one comes from the Pacific coast and the other from a busy town in the central part of New York State and the traffic centre of a populous district. The car illustrated on this page is one owned by the Southern Pacific Company. Similar cars are being used by the Stockton Electric Railroad Company, the San José Railroads, and the Fresno Traction Company, operating in the same vicinity. Cars of the centre-entrance type constitute quite a departure on the Pacific Coast, inasmuch as the California type has for years been the standard in many of the coast cities, especially those in Southern California, where, in view of the climate, its combination open and closed features have made it very popular.

The new cars present a very handsome appearance, both inside and out, are thoroughly convenient for the near-side stops required in most California cities and have achieved even greater popularity with the public than the California type. This should be particularly true in the case of Los Angeles, where traffic congestion and sharp curves make a car of the new type particularly adaptable.



Centre-entrance Car used by Southern Pacific Company.

The new cars have all-steel underframes made up of plates and structural shapes, and the construction throughout is of considerable interest. Side sill and belt rail are formed of angles to which the side plate is riveted, the whole forming a girder which is broken on either side at the centre doorway. The strain is carried over the doorway by means of channel sections, the top of the frame being curved to conform to the shape of the roof, which considerably increases the stiffness and resistance to compression. Centre stringers are formed of angles, and the crossings consist

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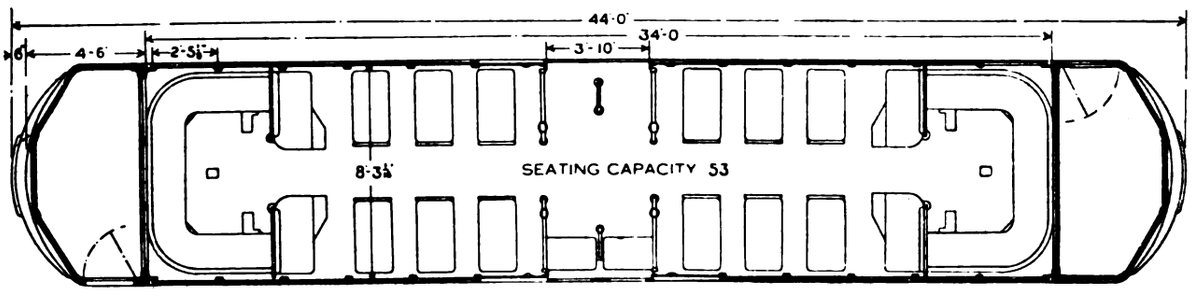
of 3-in. channels riveted together. The bolsters are made up of Z bars, reinforced by angles and rectangular bars. The longitudinal members extending from bolsters to end sills are formed of 3-in. Z bars and support the centre plate. The load of the car is transmitted to the centre plate partly by the bolsters and partly by a steel girder, forming a bulkhead between the body of the car and the motorman's cab at each end. The floor is supported on angles riveted to the inner side of the side girders. Side and door posts are formed of T iron of suitable dimensions. The plain arch roof is supported on composite carlines.

save those on either side of the centre doors. The usual push-button signal system is installed in each side post. The motorman's cab at either end of the car is raised above the main floor level and is completely separated from the body of the car by the steel bulkheads, in which there are two windows arranged to drop into pockets. The cabs are provided with three front windows and one on the brakestaff side, all of which drop into pockets. On the controller side is a single door, which swings in against the bulkhead.

The photograph on this page shows a type of car with centre doors of which a number of specimens have



Plan of Car used by Southern Pacific Company.

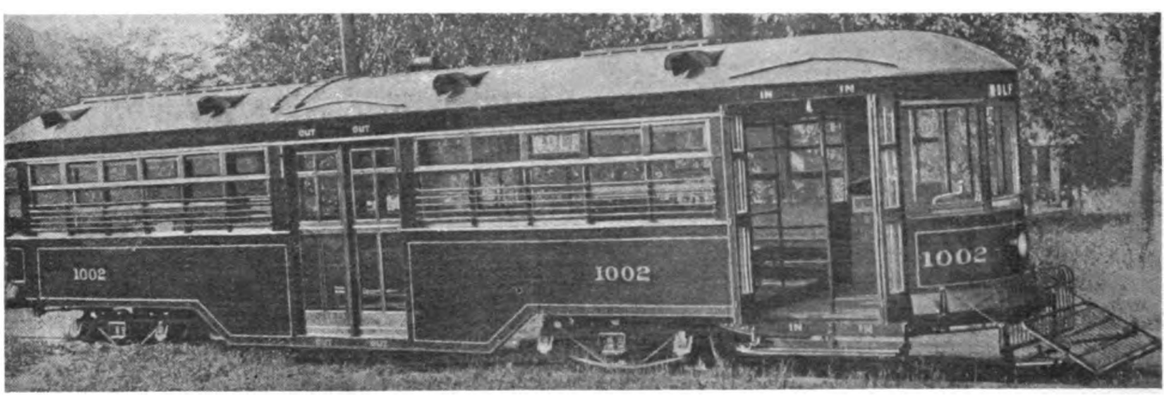
The interior of the cars is neatly finished. Steel posts are covered with mahogany to correspond with the doors and window frames. The hinges, door handles, seat back grab-handles, window and shade fixtures, and similar hardware are of solid bronze heavily nickel-plated, and the pipe stanchions and railings are white enamelled. The seats are upholstered in rattan and are reversible, with the exception of one on either side of the aisle at each end. These are stationary, and the backs are surmounted by brass grilles. Rattan-upholstered benches run round each end, and the backs are fitted with brass grilles which separate them from the steel bulkheads.

A notable feature is that the centre doors are air-actuated, with electric control at the conductor's

been built for the Syracuse lines of the New York State Railways. An extended description of this car has been given by Mr. F. L. Hinman, master mechanic of the Syracuse lines.* The following are leading dimensions, etc., of these cars :—

Length over bumpers	...47 ft. 7 in.
Width over side plates	... 8 ft. 2 in.
Height from rail to step	... 13¼ in.
Height from step to floor at centre	... 11⅝ in.
Ramp of floor from bolster to centre	... 5½ in.
Truck centres	... 25 ft.
Seating capacity	... 53

The cars are mounted on Baldwin Locomotive Company arch-bar trucks, having 26-in. cast-iron wheels and are equipped with four Westinghouse 506-A motors and K-6 controller.



Car with Front Doors for Entrance and Centre Doors for Exit.

position. The doors are of the double-sliding type, moving on outside steel sheaves. The conductor's position is directly opposite the entrance exit, and he is provided with a seat and foot-rest, which may be folded back against the panels marking the doorway. By this arrangement the conductor is above the level of the passenger's heads and is permitted a clear view of the interior of the car. The centre door connection is such that the motorman cannot receive the starting signal until all doors are closed. Windows are of the double-sash type, the upper sashes being stationary, while the lower ones are arranged so that they can be raised to the height of the lower edge of the upper sash.

Wire mesh screens are placed outside all side windows,

In designing this car particular attention was given to the elimination of all weight possible without detracting from the strength of the structure or the general appearance, especially of the interior. The car completely equipped ready for service weighs approximately 33,000 lb. without passengers.

The exterior of the car is painted the standard green recently adopted by this company, and ornamented by a single gold stripe on the side plates and dashers. The numbers on the sides and dashers are also done in gold. The sash and doors are finished in natural cherry, the small upper sash being continuous and applied outside of the posts.

* In *Electric Traction*, Chicago.

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The interior of the car is also finished in natural cherry with white enamel head lining which carries no ornament, the joints between the sections being covered by a cherry batten. The seats are covered with canvas-lined seat cane and are arranged longitudinally along both sides and round the semi-circular portion of the rear end. On account of the ramp in the car floor it was necessary to provide a break in the elevation of the seats of 2¾ in., which is taken care of by terminating the different sections at a small dividing panel extending slightly above the higher section.

The conductor's position is just forward of the centre-door opening and on the same side of the car, a slightly raised platform being provided in this place. A special type of folding seat has been installed for the use of the conductor. A railing is mounted on the platform which is arranged to carry the fare box, change table, door control handles and motorman's signal button. A small steel locker has been installed to provide a place for the conductor to lock up articles found on the car, extra transfers, change, etc.

Westinghouse straight-air brake equipment is used, air being supplied by type D-1-H compressor with Lord screenless air cleaner used in connection with this equipment. The cooling coil for the compressed air consists of two lines of 1-in. pipe arranged in such manner that the air divides, passing through both pipes to the reservoir simultaneously. This has the effect of reducing the velocity of the air in the discharge pipe, and it is believed that more complete cooling will result.

Great care has been exercised in piping these cars to see that no pockets in the piping are left. The supply pipe for the brake valve, as well as the brake cylinder pipe, are carried from the reservoir and brake cylinder respectively up through the floor of the car and along the side of it to the front platform. The object of this installation is to prevent, if possible, condensation and freezing during the winter months. PV-2 brake valves and S-6-A governors are supplied.

The headlining material is of Agasote and is put up in four sections. The sections extend from the advertising rack on one side of the car to the advertising rack on the opposite side. Additional sections of the same material are applied behind the advertising racks. The seats are of a type in which no cushion springs are used, the seats themselves being shaped in such a manner as to create a natural tendency for the passengers to keep their feet out of the aisle space. The seat height ranges from 17¾ in. minimum at the bolster to a maximum of 19½ in. at the centre opposite the exit doors.

The centre doors are operated by two National Pneumatic Company's type G-M 2⅝ × 6 in. door engines, which also contain the door signal switches. The front entrance doors are operated by National Pneumatic Company's manual door device of a special design. The door signal system consists of a Consolidated Car-Heating Company's signal light box, together with the necessary resistance. Switches for operating these lights are part of the door engine.

The illumination of the car body is taken care of by five 94-watt tungsten lamps provided with holophane shades, a sixth unit being arranged to be cut into the circuit to replace a defective lamp, by means of a Nichols-Lintern selector switch placed convenient to the conductor's position.

The heating is provided for by a Peter Smith forced-ventilation heater having a special intake damper allowing the air to be taken from outside of the car body through an opening in the vestibule sash behind the heater, or from inside of the front vestibule In addition to the ventilation secured by the use of the above heater, eight sets of automatic ventilators have been provided.

A Crouse-Hinds focussing type headlight is provided on the front dash and is equipped with a 94-watt concentrated filament lamp arranged with a special two-section resistance which makes it possible to dim the lamp sufficiently to operate in city service and by turning a switch in front of the motorman a bright light can be had for use on the suburban portions of the line.

ONE-MAN CARS.

Now that military tribunals are granting only temporary exemption to eligible motormen under a certain age, and are even asking why women cannot be employed to drive tramcars on steep gradients, further experiments with one-man cars seem opportune. There are a number of tramways whereon single-deck cars are run. These vehicles have platforms with open sides, and the passengers could enter and leave by the motormen's end, the rear platform being closed until the return journey. Payment could be made on entry, and, as in the case of the single-deck payment-on-entry cars at Gateshead, no objection would be raised by the Board of Trade to the use of the front platform as an exit. Possibly the only opposition would arise from the employees' union, but their views must be subordinated to the national welfare, just as trade union usages have had to be temporarily abandoned in other departments of labour. At Ballarat and Bendigo one-man car operation was introduced before the war, and it has not only been the salvation of those tramways in a financial sense, but has enabled the company to release a large percentage of men for military service, viz., 29 per cent. at Ballarat and 32 per cent. at Bendigo. Tramways in Australia generally have not experienced the almost general increase of traffic that has fallen to the home tramways during the greater part of the war period. Lately, however, there has been an improvement, although the majority of the undertakings are still considerably less favourably situated than in normal times. The dry season is responsible for some of the depression. A great drawback in Australia is the trouble caused by industrial matters, the managers of tramway and other undertakings having to give a great deal of time to avoiding the constantly-recurring claims of new legislation. In our issue of December 18, 1915, we gave an account of the working of one-man cars on the Ballarat and Bendigo tramways, the innovation being introduced by Mr. P. J. Pringle, chief engineer and general manager to the Electric Supply Company of Victoria, Limited.

In the United States last year there was a noteworthy development of one-man car operation, and to a lesser extent in Canadian cities. In order successfully to meet the jitney competition one of the developments was the use of one-man cars as the means of reducing maintenance cost due to the extra service demanded, and the development of an extremely light-weight and inexpensive, yet reliable, motor with the rating of 17½ H.P. and 24 H.P. These motors weigh approximately 850 lb. The jitney service, which attained such popular prominence during the summer of 1915, has declined almost as rapidly as it developed, and in some cities has entirely disappeared. Short and spasmodic as it was, however, it has served in many cases as a means of urging railway companies toward greater economies and efficiencies, enabling them to provide better and more continuous accommodation for the travelling public.

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EFFICIENCY IN CAR OPERATION.*

By J. F. Layng

There are certain fundamental economies that can be obtained in the operation of electric motor cars. These are dependent upon the running time, number of stops per mile, length of stop, rate of acceleration and deceleration, and equipment weights. A careful study of each of these elements is necessary to determine whether any road is operated at the minimum cost, or at the maximum efficiency. The points which will be brought out can be demonstrated by the "efficiency engineer" in the same way as are other items of expense that are entered on the books of an electric railway or tramway. The increase in the cost of producing transportation will cause the future successful management to study thoroughly the conditions of operation of each particular section of an undertaking.

It is a regrettable fact that the number of stops per mile and the length of stop is a phase of operation that has received but scant consideration. How many managers know how many stops their cars make per mile? As a matter of record I am sorry to say that during an investigation of requirements for the purchase of new equipments the manufacturers found that the answers to the requests for these data from managers sometimes vary 100 per cent. from the actual conditions. It is almost invariably the belief that a car makes more stops than is shown by actual check.

In order to show just what these points mean in service, a number of calculations have been made and the results plotted in the form of curves. These calculations have been made on the fundamental laws of gravity, speed, and time, from which there is no appeal. This discussion is not based on a theory; it is a condition which, if we accept, leads to truly scientific management. The curves show energy consumption for different rates of acceleration, braking, and length of stops when maintaining the same schedule, extending coasting with allowable increase in schedule speeds, effect of length of stops on schedule speeds, and effect of the number of stops per mile on schedule speeds and power consumption.

Since the early days of electric traction, it has been well known that on test runs there are great differences in the power used, even when the service conditions are the same. With a given car over a given route, with the same number and length of stops, the power consumption will vary more than 30 per cent. when operated by different motormen. This emphasises the differences which it is possible to obtain by operating the car at different rates of acceleration and deceleration; the difference being, of course, in the amount of coasting which is obtained by the different methods of operation. A few years ago a number of investigations were made to determine some systematic method of securing the maximum amount of coasting at all times, and as a result the coasting clock was designed. In other instances wattmeters and ampere-hour meters were used, the idea being to obtain in each case the maximum amount of coasting, which necessarily will give the minimum of energy consumption.

* The increase in the cost of labour and materials make imperative the utmost economy in tramway operation. The writer of the article, here reprinted from the American *General Electric Review*, points out several factors in the working of electric lines by which economies may be effected. The text and curves bring out certain points very clearly and forcibly. The conditions on American electric railways, on which the article is based, differ largely, of course, from those prevailing in Great Britain and in many foreign lines, but Mr. Layng's study is nevertheless suggestive to those who are not satisfied that the greatest possible efficiency has been obtained from our tramways as a whole.

To illustrate these points, calculations and curves have been made on cars weighing 18 tons complete with load, and equipped with two motors. It is assumed throughout the calculations that the car is geared to have a free running speed of 22 miles per hour, a 1,000 ft. run schedule speed of 10·65 miles per hour, 7-second stops, and 20 lb. per ton friction.

Fig. 1 shows the car accelerating at ¾, 1, 1¼, 1½, and 2 miles per hour per second. The watthours per ton

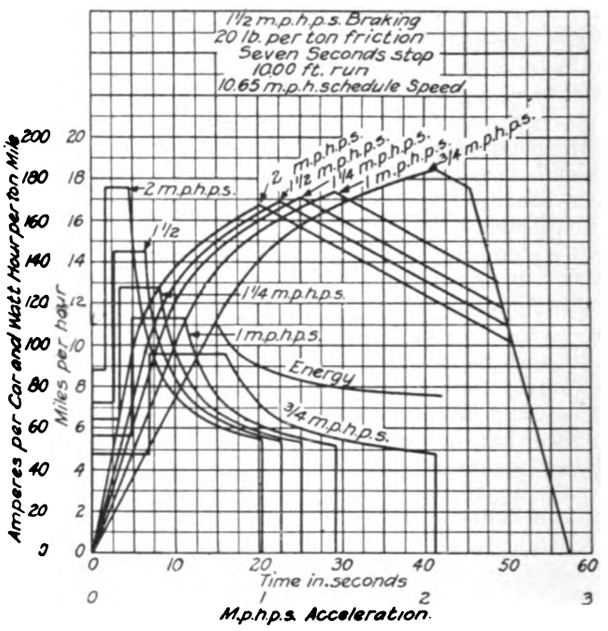

Fig. 1. Showing Decrease in Energy as Rate of Acceleration is Increased.

mile obtained with these different rates of acceleration are 110, 90, 83, 79, and 76 respectviely. From this it can be seen that the percentage of difference of energy used from 110 to 90 watthours per ton mile is 18 per cent., while the saving between 90, 83, 79, and 76 will be 7½, 5½, and 3·8 per cent. respectively. This analysis shows that low rates of acceleration are exceedingly wasteful and inefficient, and the difference in power consumption at the higher rates of accelera-

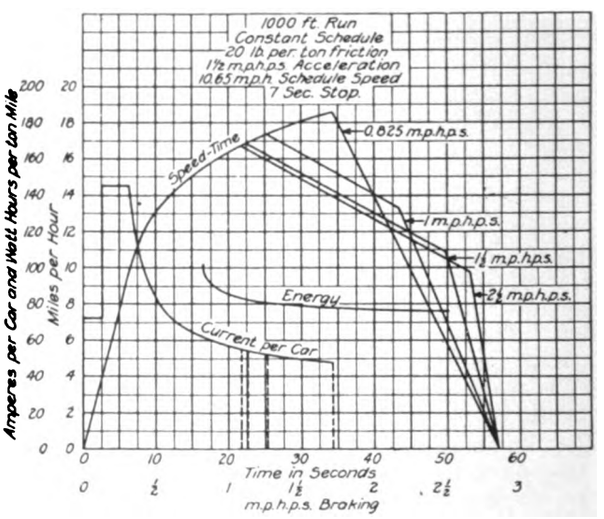

Fig. 2. Showing Decrease in Energy Consumption as Rate of Braking is increased.

tion, while material, are not nearly so great. It will be noted that the total difference in power consumption of 110 watthours per ton mile for accelerating at ¾ miles per hour per second and 76 watthours per ton mile for accelerating at 2 miles per hour per second is 31 per cent. This is a larger figure than can be obtained in normal operation, and this point will be explained later.

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In reviewing these figures, it will readily be appreciated that a control, automatic in operation, will enable the management to select a pre-determined economical rate of acceleration that will always be maintained in service.

The next thing which we have to consider is different rates in braking. Fig. 2 shows curves braking at 0·825, 1, 1½, and 2½ miles per hour per second. With these values, and under the same conditions as are outlined for acceleration at 1½ miles per hour per second, the power consumption will be 100, 85, 79, and 76 watthours per ton mile respectively. The percentage of differences between these figures is 15, 7, and 4 per cent., and the total difference between 100 watthours per ton mile and 76 watthours per ton mile obtained with the maximum and the minimum braking is 24 per cent. It will be well to explain that the savings shown by these two sets of curves for different rates of acceleration and braking are not additive in every case, but it is possible to obtain either of the savings separately. With the lowest rate of braking and accelerating there is a point where the lines cross, which would make it impossible to keep the schedules as outlined.

With a given car there are two other features which enter into the question of power consumption, viz., the effect of the length of stops, and also the question of

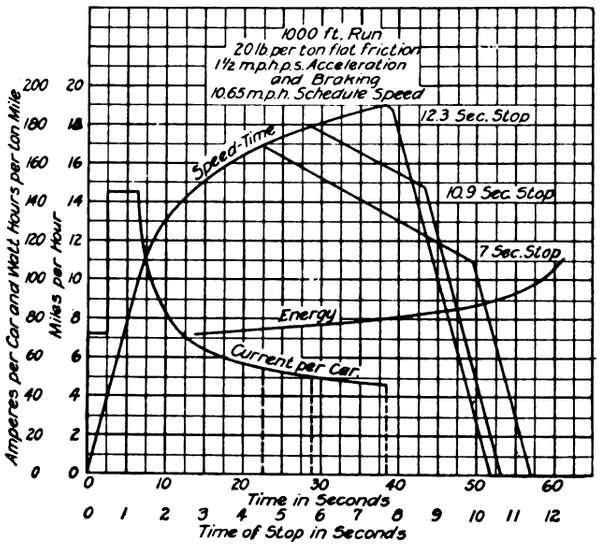

Fig. 3.—Showing Increase of Energy Consumption for a Given Run and Schedule as the Time of Stop is Increased.

extending the running time. In Fig. 3 is illustrated the effect on power of lengthening the stop from 7 to 10·9 and 12·3 seconds, and still maintain the same schedule. With the 7-second stop the energy required will be 74 watthours per ton mile, and with the 10·9-second stop it will be increased to 81 watthours; with a 12·3-second stop the energy will be increased to 105 watthours per ton mile. These figures indicate the advisability of doing everything possible to facilitate the rapid loading and unloading of the passengers, and it brings in the consideration of the method of fare collection, low step, and general efficiency of the trainmen.

Fig. 4 illustrates the amount of energy which may be saved by extending a given schedule. This curve, while interesting, shows savings in power which will in all probability be offset by the greater expenditure for platform wages. The tendency among all progressive operators has been to do everything possible to facilitate the making of high schedule speeds, and the analysis shows that in nearly every case it is advisable to sacrifice power and maintenance savings for platform wages, since the platform wages represent such a large portion of the operating ratio. However, there are lines operating that have large leeway in the schedules, but conditions are such that changes in running time and service conditions will not allow a reduction in the cars to give required service. In this case the maximum amount of coasting can be procured effectively.

One of our problems is to determine how to secure the maximum number of car miles per hour. In order to establish a ready check as to what schedule speeds are possible with a given number of stops per mile,

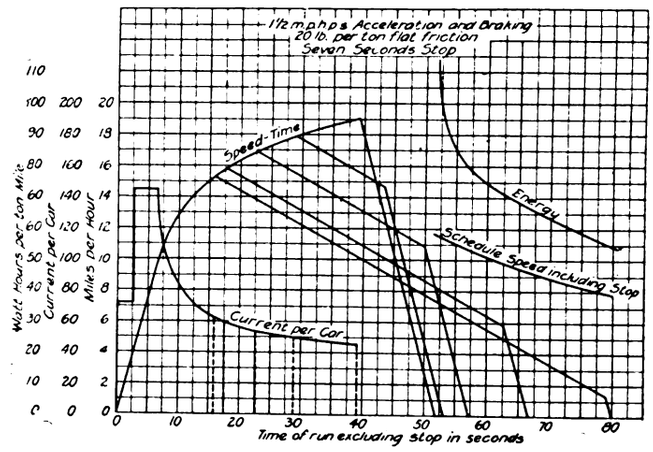

Fig. 4.—Showing Decrease in Energy Consumption, Current Input, and Schedule Speed by increasing the Coasting in a 1,000 Ft. Run.

and also the general effect on power consumption, curves 5, 6, and 7 are presented.

Length of stops has a great influence on the general efficiency of a system. In securing data for new equipments, it is found in different cities that the average length of stop varies from five to ten seconds. The importance of shortening the stop to a minimum from a power consumption standpoint, is shown in

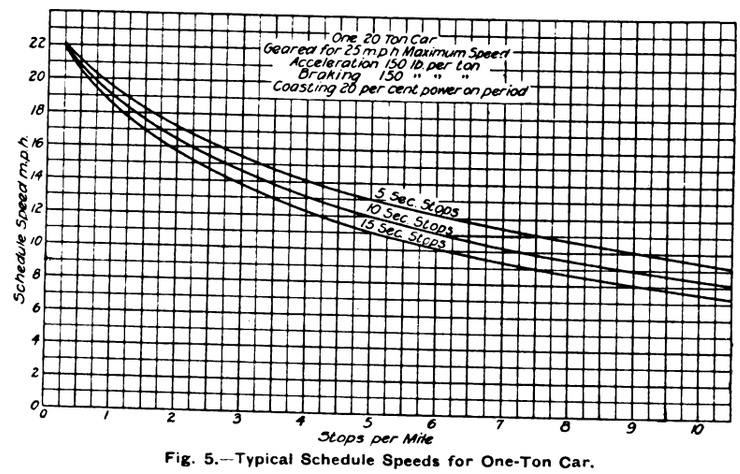
One 20 Ton Car
Geared for 25 m.p.h. Maximum Speed
Acceleration 150 lb. per ton
Braking 150 " " "
Coasting 20 per cent. power on period
5 Sec. Stops
10 Sec. Stops
15 Sec. Stops
Schedule Speed m.p.h.
Stops per Mile

Fig. 5.—Typical Schedule Speeds for One-Ton Car.

Fig. 3, for different lengths of stop when the same schedule is to be maintained. However, there are conditions where instead of maintaining the schedule the running time is extended. To explain this latter condition the curves shown in Fig. 5 are given. With a car geared to a free running speed of 25 miles per hour, making seven stops per mile, it will be noted that it is possible to make a scheduled speed of 10 miles per hour with 10-second stops, while with 5-second stops the schedule speed will be increased to 11·2 miles per hour, or 11·2 per cent.

Fig. 6 shows a 20-ton car geared for a free running speed of 15, 20, 25, and 30 miles per hour, and the

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watthours per ton mile at the car are also shown with each of these variables. Curve 7 gives the same information for a 40-ton interurban car, geared for 30, 40, 50, and 60 miles per hour, free running speed. It is interesting to note the effect of stops per mile on schedule speed and power consumption. Take a 20-ton car, geared for a free running speed of 25 miles per hour, and comparing the services of seven and nine stops per mile, it will be noted that with seven stops per mile it is possible to make 11·2 miles per hour

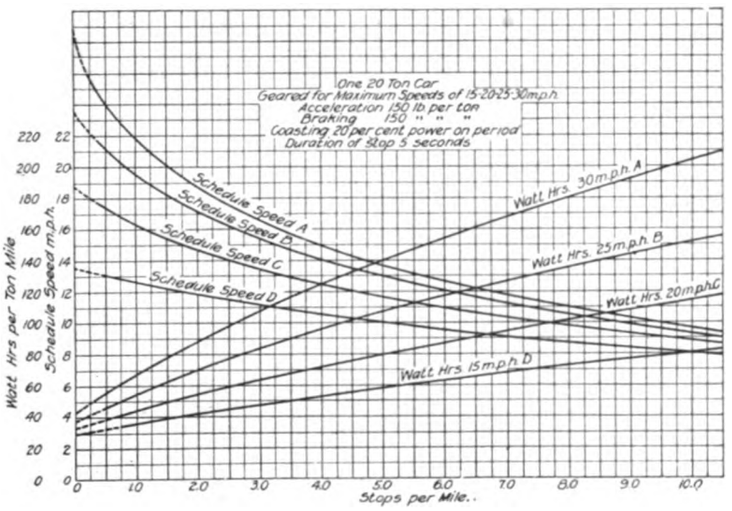
One 20 Ton Car
Geared for Maximum Speeds of 15-20-25-30 m.p.h.
Acceleration 150 lb. per ton
Braking 150 " " "
Coasting 20 per cent. power on period
Duration of Stop 5 seconds
Schedule Speed A
Schedule Speed B
Schedule Speed C
Schedule Speed D
Watt Hrs. 30 m.p.h. A
Watt Hrs. 25 m.p.h. B
Watt Hrs. 20 m.p.h. C
Watt Hrs. 15 m.p.h. D
Watt Hrs per Ton Mile
Schedule Speed m.p.h.
Stops per Mile.

Fig. 6. Typical Schedule Speeds and Energy Consumption for 20-Ton Car.

schedule, and that the power consumption will be 2·52 watthours per car mile, while with nine stops per mile a schedule of 9·8 miles per hour can be made, and the power consumption will be increased to 2·88 KW. hours per car mile. When comparing the 7 and 9-stop per mile services it should be noted that with nine stops the energy has been increased 14·25 per cent., and what is more important the schedule speed has been decreased practically 10 per cent.

An example of the power and schedule savings that can be made will be illustrated by a car making 40,000 car-miles per year. Assuming that the power costs one half-penny per kilowatt hour delivered at the car, the difference between seven and nine stops per mile would be a saving of about £20 per year per car in power. On the assumption that the car makes 40,000 miles per year and maintains a schedule speed of 11·2 miles per hour, the car would be in operation 3,571 car-hours, while if making a schedule speed of 9·8 miles per hour, the car would be in service 4,081 car-hours. These figures illustrate the advisability of cutting down and eliminating all useless stops, and show the necessity of inaugurating skip stop, nearside stop, and every other means which we have at hand to reduce the number of stops per mile. It may be said that on some lines, even though the schedule speed were increased from 5 per cent. to 10 per cent., it would not be possible to decrease the number of cars actually required for the service, but still there are a larger number of other cases where it is possible to take the full advantage of the savings which are obtained by operating at the maximum schedule speed.

The advantages accruing from reducing the number of stops and thereby increasing schedule speeds is not by any means all with the railway company, but is also shared in even larger proportion by the patrons. Assume that operating conditions have been changed so that it is possible to shorten a schedule five minutes, and that the car carries 50 passengers, it is reasonable to assume that at least half of these passengers benefit to the full extent of the saved time. On this basis the total time saved for half of the passengers would be 125 minutes. The total aggregate time saved to a community would be stupendous. Some of the large progressive companies have different schedule speeds to economically meet the varying conditions of traffic. I know of one company that operates four different schedules, which apply to the morning rush, mid-day service, evening rush, and the evening service. During the non-rush hours schedules are speeded up and every possible advantage taken to decrease the number of cars needed, and to speed up the remaining cars so as to give the proper interval between the cars.

In using curves 6 and 7, it should be borne in mind that they apply only to tangent level track, without curves, and do not include any traffic delays. In ordinary practice, adding 10 per cent. to the schedule speed will enable the theoretical values to be applied to actual conditions.

So far we have been discussing the savings which it is possible to obtain in operation. There is one other feature which was recently called very strongly to our attention, that is, the substituting of trucks and motors arranged for 24-in. wheels where 33-in. wheels are now used.

In the particular case to which I refer a pair of trucks for these cars weigh 14,000 lb., the cars being equipped with two motors weighing 3,370 lb. each. By substituting four motors which weigh 1,900 lb. each, the total weight savings when substituting four small motors for the two large motors was 3,140 lb. The saving in weight by substituting 24-in. wheel trucks was a further weight saving of 5,400 lb., making

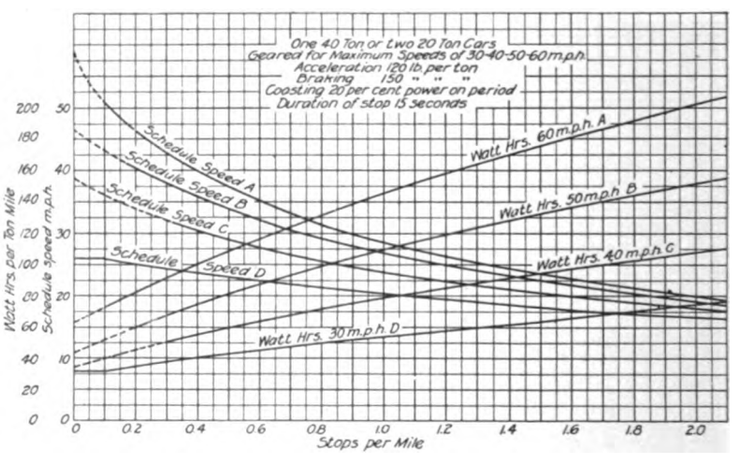
One 40 Ton or two 20 Ton Cars
Geared for Maximum Speeds of 30-40-50-60 m.p.h.
Acceleration 120 lb. per ton
Braking 150 " " "
Coasting 20 per cent. power on period
Duration of stop 15 seconds
Schedule Speed A
Schedule Speed B
Schedule Speed C
Schedule Speed D
Watt Hrs. 60 m.p.h. A
Watt Hrs. 50 m.p.h. B
Watt Hrs. 40 m.p.h. C
Watt Hrs. 30 m.p.h. D
Watt Hrs per Ton Mile
Schedule Speed m.p.h.
Stops per Mile

Fig. 7.—Typical Schedule Speeds and Energy Consumption Curves for One 40-Ton or Two 20-Ton Cars.

a total reduction in car weight of 8,540 lb. This weight reduction amounted to 20 per cent. of the weight of the car, and the figures show that it much more than pays for the investment.

There are other substitutions on the car body and car equipment which can frequently be made to considerable advantage. In nearly all cars which were built some time ago there are certain elements which are extremely heavy, and lighter weight material could be substituted at a small cost. Recently the new

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management of a road were discussing why it was necessary to have large heavy drawbars on the cars, which were never used. This is merely taken as an illustration to show that there are many cases where there is apparatus on a car having considerable weight, which is being hauled around year after year, when the weight could easily be saved and the power expense and other expenses incident thereto eliminated to advantage.

During the past year there has been a large growing tendency to apply light weight, one-man cars to many services. This feeling is not confined to any particular district, but is growing more and more general. On nearly every property which I have visited recently there has been a tendency to place small, light weight, one-man cars in stub-end service. An analysis of the number of passengers carried throughout the day in many instances shows that a car having a seating capacity of approximately 30 passengers would be sufficient for practically all needs.

In analysing the traffic on city lines, there are usually found several cases where the receipts per car mile are far below normal. These lines are the ones which drain the net earnings and are a necessary evil. The small car, in many cases, will transform a deficit to an earning.

Recently we had occasion to analyse a service where two cars were required. At the present time cars weighing 56,500 lb., operated by two men, are employed. This particular company buys power, paying two cents per kilowatt-hour for current. In going over the conductors' reports it was found that with the exception of one trip a day never more than 15 passengers were carried. However, these cars were used to transport the workmen of a particular factory, which always closed at a particular hour, and at this period 80 passengers would have to be carried. During the remainder of the day the load would vary from two to 15 passengers. The management of this company have practically decided to purchase four 10,000 lb. one-man cars seating 30 passengers. The power will be reduced to approximately one-fifth of that which is now being obtained, and the labour saving will be reduced to slightly more than half.

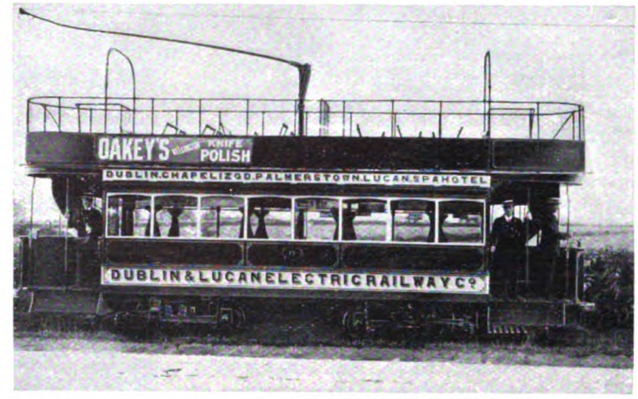
One of the most progressive managements that I know of is at present analysing the service of a large representative city to determine just what can be done with extremely light weight one-man cars. Their preliminary analysis shows that there will be, first, a saving of wages ; second, a saving in power ; third, a saving in maintenance ; fourth, the development of traffic, due to more frequent service ; and, fifth, a reduction in accidents. Of course, it is not intended that these light weight one-man cars shall be substituted for every class of service. There are certain classes of work, such as the congestion in the down-town city streets, which would make it inadvisable to ever attempt, or even seriously consider, the use of small cars. However, there are certain lines which can be picked out in every city, where the small car can be substituted for the large car and enormous savings made. From present indications it would seem that a large number of places can be found where the installation of the small cars would pay 50 per cent. or more on the investment.

The small one-man car should be equipped with all possible safety and time-saving devices, which should include air brakes, control with dead man's release, which automatically cuts off power, applies brakes, sands track, and opens car door. When these features are properly applied they are time-savers, and in case of accident put the railway in the position of having provided the greatest possible protection.

With the rising cost of producing transportation, and the increased competition of the privately owned automobile, it is apparent that it will be necessary to introduce the new forms of light weight one-man cars for many places, and it will merely be a question of analysis to determine just how many applications can be made of this recent addition to transportation.

PROTECTION FROM TROLLEY BOOM.

From Mr. D. McDowall Grosart, engineer and manager of the Dublin and Lucan Electric Railway Company, we have received the photograph reproduced below, showing a car on which arched rails have been erected with the object of protecting passengers in case of an accident to the trolley boom. Mr. Grosart remarks



Car with Arched Rail, as a Protection from the Trolley Boom.

that the idea was applied to the Dublin and Lucan cars 15 years ago. In addition to the value in earth protection, the arched bar is covered with solid white rubber canvas hose, so that the rail is prevented from becoming alive in the event of a wire falling on the bar. In some rebuilt cars the arched bar has been combined with the hand rail, as shown in the photograph, which improves the appearance of the car.

RAIL TRAFFIC AND AIR RAIDS.

The Field-Marshal Commanding-in-Chief the Home Forces has issued a statement with regard to suggestions made by local authorities that there is danger during aircraft raids from tramways and railways. Lord French says :—" It is confidently believed that it is only necessary to assure the public that the continuance of railway and tramway traffic does not serve as a guide to hostile aircraft, and is of vital importance for the successful prosecution of the war, for them to accept the decision and co-operate in carrying it out with loyalty and patriotism."

In reply to a communication from the Southwark Council, Major-General Sir Francis Lloyd has stated that all possible steps are taken for protecting life and property in London on occasions of attack by hostile aircraft, and only such lights are permitted on railways and tramways as are absolutely necessary to ensure the continuance of traffic which is of the greatest national importance. From observation made it is interesting to note that sparking from electric trains and tramways tends rather to confuse than to assist hostile aircraft in finding their way over London, and, further, it is not considered desirable to issue public warnings of impending air raids or to notify the public when the danger is past.

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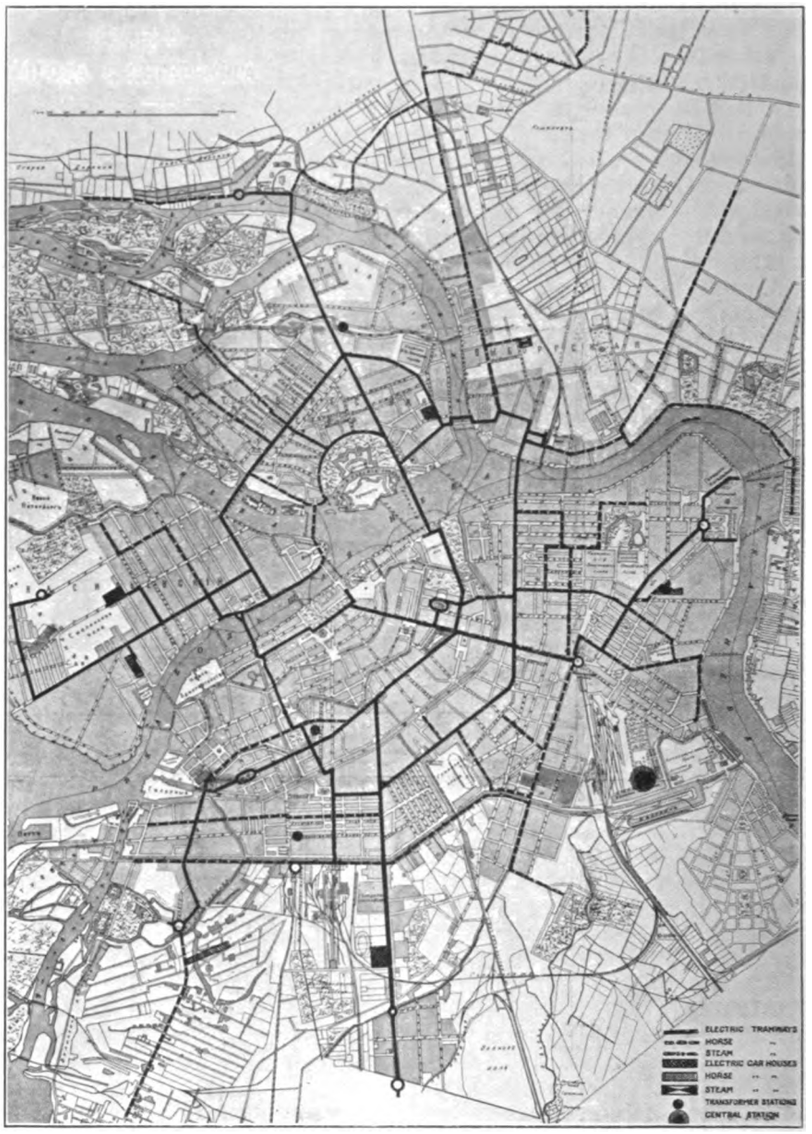
PETROGRAD ELECTRIC TRAMWAYS

Before the war the Petrograd tramways were on the eve of important developments. The city has a population of about 2,000,000, and is situated mainly on a peninsula formed by a curve in the River Neva just before it enters the Gulf of Finland. The river subdivides into several branches, forming islands which are ten or eleven feet above the average level of the gulf. A ship canal, with a harbour capable of accommodating 50 sea-going ships, makes the city a seaport. For nearly five months of the year the river is frozen to a depth of two or three feet. The larger part of the city is located on the left bank of the river, and includes the best streets, bazaars, markets, the palaces, cathedrals, and theatres, and all the railway stations except that of the Finland Railway. A granite embankment extends along the river at this part, and is bordered by palaces and large private houses. Midway of the embankment, behind a line of fine residences, stands the Admiralty, the very centre of the capital, surrounded by a broad square on three sides. On one side is the monument to Peter the Great, backed by the cathedral of St. Isaac, and on the other side are the Ministry of War and the Imperial Winter Palace, the latter of huge dimensions. The topography of the city is simple; three long streets, the main arteries, radiate from the Admiralty, and are intersected by three girdles of canals, with which a number of streets run parallel. The Prospekt Nevski, extending from the Admiralty to the Moscow railway station and on to the Neva, is the principal shopping thoroughfare, and always presents an animated scene. The centre of commercial activity is at the eastern end of Vasilyevski Island. The stock exchange and the quays and store-houses are in this section, and on the rest of the island, facing the Neva, are scientific and educational institutions. The fortress of St. Peter and St. Paul, now a state prison, occupies another of the islands, while still others have a great botanical garden, public gardens and parks, and summer residences. They are also covered in part with dwellings.

The tramways of Petrograd were acquired by the municipality from British owners in 1907, and in that year the electrification of the system was commenced, and when the war broke out it had so far proceeded that there were over 400 motor cars and about 200 trailers of which all but a small proportion were in daily service. The motor cars, which are of the single-deck type, weigh about 12 tons and provide seating places for 24 passengers inside, and 16 standing passengers can be accommodated on the platforms. Trailer cars of both single and double-deck types are used. The motor trucks are of the radial single-axle design, known as the Nuremburg type, in which the weight of the car body is taken on segmental plates and the pivotal point over the centre of the axle. The maximum speed is 16 miles per hour, including stops. The cars are in operation for 16 hours per day, and the average car duty is 80 miles per car per day. Three-phase current at 6,600 volts, 25 periods, is generated at the central power station, and is delivered by an underground cable to sub-stations, where it is transformed by means of rotary converters and used at 600 volts.

The present position of the Petrograd tramways, according to the *Novoie Vremya*, is becoming rapidly worse. The manager to the tramway committee, A. Y. Brafman, reports that complete paralysis is threatened. The rolling stock is becoming worn, and as there are no means of repairing the cars, the number in service is being gradually reduced. There is a scarcity of workmen for the repair shops: repair parts are wanting, and the Corporation's orders are not being filled at the factories. The Town Duma has applied to the Government to allow workmen to serve on the tramway system as a work of national defence.



Map of Petrograd Tramways. *(Brill Magazine.)*

The management have made an experiment recently on one route, with two conductors to a car. The results were not satisfactory. The collection of the fares for that day on the experimental route did not increase, and the disorder in the car was just as great as before. The conclusion has consequently been reached that putting two conductors on one car does not pay.

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A ROTARY CONVERTER TRACTION EQUIPMENT IN BARCELONA.

In view of the fact that electrical enterprise in Spain has until recently been in the hands of the Germans, and latterly of the Americans, it is interesting to learn that important traction equipment has been installed by the General Electric Company, Limited, of Witton, Birmingham, and 67, Queen Victoria Street, London, E.C., for the Barcelona Tramways Company.

The installation in question, which is depicted in the accompanying illustrations, comprises the electrical equipment of the Coello

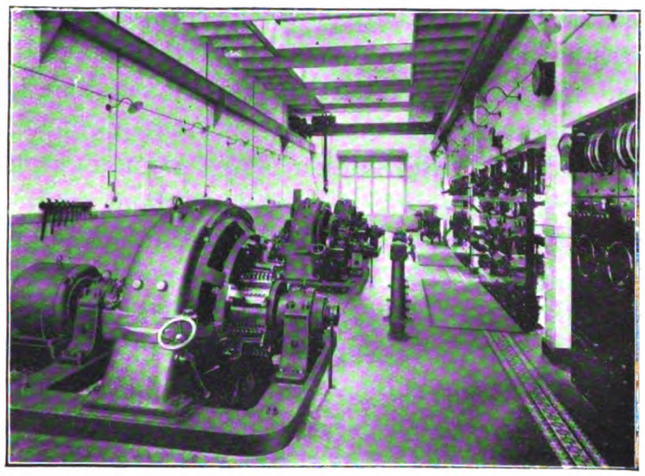

Fig. 1.—Three 500-kw. Witton Rotary Converters from the C.C. side.—Barcelona Tramways.

sub-station, aggregating 1,500 KW. Three-phase power is received at 6,000 volts, being reduced to 450 volts by oil-insulated air-cooled transformers located in the basement and situated between the machines. To gain access to each transformer a removable checker plate is let into the floor which can be lifted when the transformer needs attention or inspection. The converting equipment comprises three 500-KW. shunt-wound Witton rotary converters running at a speed of 750 revolutions per minute, fitted with interpoles, and generating continuous current at 600 volts. The energy so produced is used entirely for traction purposes.

Each rotary converter is provided with a slip-ring starting motor for running up speed, synchronising being effected by operating the

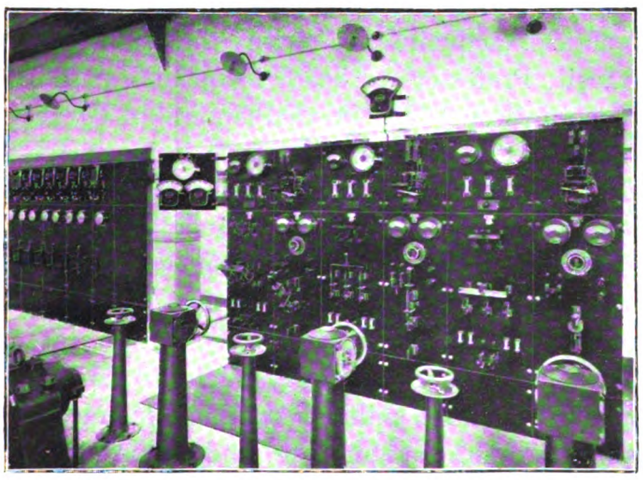

Fig. 2.—Witton Low-tension Switchboard for Controlling A.C. and C.C. of the Rotary Converters.

rotor rheostat of the slip-ring motor. The motor is carried on an extension of the converter shaft. Suitable pillars for controlling the regulators are mounted near the switchboard as shown in Fig. 2. In addition, each rotary may be run up from the continuous current side by means of a change-over switch and starting resistance, which is similarly operated from a hand-wheel pillar. For the front of the board a double-pole change-over switch is also provided to reverse the shunt coil of the reverse-current trip when starting in this way.

In the illustrations, Fig. 1 shows the c.c. side of the rotaries. That portion of the main switchboard controlling the low-tension side of the station is seen in Fig. 2, where all the regulating pillars can also be discerned. In Fig. 3 a view of the a.c. side of the rotaries and feeder switchboard is shown.

On the controlling switchboard shown in Fig. 2, each rotary converter a.c. panel is fitted with ammeter, power-factor meter, and switch and fuses for the starting motor. Adjacent to each a.c. panel is the corresponding c.c. panel, on which is mounted a circuit-breaker having overload trips as well as a tripping coil operating in conjunction with an over-spread device for each converter, in addition to the change-over switch and the single-pole main switch for starting from the continuous current side.

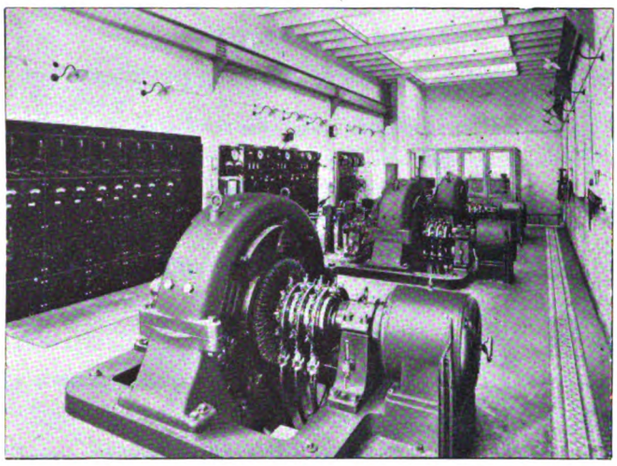

Fig. 3.—A.C. Side of Rotary Converters Showing the Witton Feeder Switchboard.

A synchroscope with machine and busbar voltmeters is carried on a swinging bracket at the end of the board. The feeder panels are each fitted with a single-pole circuit-breaker main switch and ammeter.

The complete installation, as described, was supplied by the General Electric Company, Limited.

CAR TRAFFIC IN MEXICO CITY.

Front End Exit and other Features.

The difference in the manner in which street car passengers are treated in Mexico and in the United States is remarked by every one who has had personal experience in this direction. In too many American cities conductors of surface, subway, and elevated cars or trains are as a rule brusque, to say the least, in their manners. Passengers are ordered in most peremptory manner to "move up in front," "step lively there," "get off the platform." etc. They are often, too, man-handled in a manner to which men and women would not submit in any other portion of the world. Platform guards at stations hurl themselves with all their weight and strength upon passengers, and literally drive them into the already overcrowded vehicles, the while using exclamations and even epithets of the most unpleasant and annoying character.

But how different in Mexico. Here, although the inflexible and admirable rule is that all passengers must leave the car by the front door and only enter by the rear, and that no one may stand on the front platform, the conductors are exceedingly polite and gentlemanly in handling the crowds, even when they attempt to violate the rules noted. They do not lift their voices in harsh orders, but when it is necessary, in the most polite and deferential manner, call the attention of passengers to the necessity for obeying the rules in order to accommodate other passengers. Many times the passengers do not appear to appreciate the necessity for co-operation with the officials, and not infrequently the rear portion of a car is seen to be crowded to the limit, while there is abundance of space in the forward end.

A novel plan pursued in the operation of street cars in Mexico city is the attachment of a mirror to one of the standards on the front platform, so that it reflects a full view of the rear platform on the side devoted exclusively for the entrance of passengers. The motorman, by watching the mirror, is enabled to see the moment all the passengers have boarded the car, and to start immediately without waiting for a signal from the conductor, who is frequently engaged in collecting fares inside the car and in a position where delay is involved should he be required to investigate before giving the signal to go ahead. The amount of time saved by this device is very considerable.—*Mexican Review.*

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LONDON, DECEMBER 7, 1916.

"Safety First."

All parties concerned are to be congratulated on the formation of a new body to be full of beneficent activities and called the London Safety First Campaign Council. A report appears on another page of the proceedings of the conference of local authorities and other bodies, at which it was determined to constitute a council that will carry on educative and other work for the purpose of so instructing and cautioning vehicle drivers and the public in the metropolitan area that street accidents may be reduced to a minimum. Owing to the darkened streets such accidents have shown a large increase, and it was more than time that something was done. To Mr. H. E. Blain, operating manager of the London General Omnibus Company, belongs the credit of calling the conference and devising machinery and a programme for a safety first campaign which is likely to have very good results. That the anticipation is reasonable is proved by the fact that while all street accidents in London show a large increase, those in which London General omnibuses were involved show a reduction of 25 per cent. since the company's own safety first campaign was inaugurated in the beginning of the year. The borough councils, both of London proper and of the area around it, have responded warmly, and they, together with tramway, railway, and automobile authorities, parcel delivery companies and firms, and not least the police authorities will all appoint representatives to the new council. A remarkable fact is that the London County Council has declined to take part in the movement, not because of want of sympathy, it was reported, but from diffidence. It may be hoped that it will join in the movement when the new council gets to work with its advertising, cinematograph pictures, instruction of school children, education of drivers of vehicles, and an adequate general scheme of street refuges. Experience will no doubt suggest additional methods, and we hope the Campaign Council will speedily get to work. Similar campaigns have done much good in America, and some British railway companies have found the benefit of them as regards their own servants. Judging from the tone of the conference the new venture is marked out for success.

Tramways and Town Planning.

Although there are some subjects in regard to which a university professor may be allowed to base his discourses solely upon theoretical knowledge, the question of town planning in relation to transit is not one of them. Owing to a lack of practical acquaintance with the subject of transit, Professor Adshead, in opening a series of lectures on "The Town Planning of Greater London after the War," fell into serious errors. To a University College audience he held the London County Council, and incidentally the engineers of the electric traction world, up to ridicule for having lacked foresight in not anticipating the motor omnibus. Yet he stated that at the same time they ought to have invested the eleven millions sterling expended on tramways in inaugurating and improving a suburban electric railway, while also improving the road surfaces and encouraging the motor omnibus. We are not aware of the number of years during which the professor has honoured the Metropolis with his presence, but whatever the period may be he lacks the information on this matter of an elementary school pupil. The latter is aware that the greater part of the tramways undertaking was opened for traffic

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at least half a dozen years before the omnibus became a reliable machine. It is to be feared that the real reason of the professor's objection to tramways is to be found in a subsequent remark that they were exceedingly obstructive, and that with motor traffic rapidly increasing, their obstructiveness was becoming more marked. Now, as regards foresight, the electrification of one suburban railway system in the south-eastern and south-western districts was not accomplished until varying periods of years after the conversion to electric traction and extension of the horse tramways, and it is only during the present year that a partial electrification of a railway in the Thames Valley suburbs has been effected. With such an example of dilatory action by two railway companies who depend upon their earnings for a dividend, the governing authority of London can hardly be accused of lack of foresight. That charge is to be laid rather at the door of their critic in imagining that London traffic of the busy hours could be dealt with by omnibuses. No expert has asserted that it could be so carried; an attempt to do so would fill the streets with a never-ending line of omnibuses and render the roads impassable to other traffic and pedestrians. Equally weak reasoning marks the professor's concern that the Council should spend their money in the improvement of road surfaces. In the past it has been almost entirely due to the construction of tramways that the thoroughfares in which they are laid have been surfaced with material fit to stand the strain of heavy motor traffic. The borough councils have had to lay the portion of the roadway outside of the rails with material more akin to the durability of the track, for the laying and maintenance of which the County Council are alone responsible. Incidentally the local and central authorities have provided the omnibuses with a track for which they pay nothing beyond the rates levied on their depots. If London were being laid out afresh in the light of the present day traction facilities, there would be something to say in support of Prof. Adshead's contention that the best use of the tramway is as a light railway with a separate track, so arranged that it has a 30-mile speed limit, only entering main roads for short distances to set down passengers at important points. The cars, however, would have to be run in trains or the system would be unable to carry the mass of passengers dealt with by the suburban railways and the tramways combined. The popularity of tramways and omnibuses arises from the convenience they afford on the main roads, and this aspect of the matter will have to be considered in town planning schemes.

The London Tramway Problem.

The question what is to be done with the London County Council tramways grows more urgent week by week. We do not doubt that it is receiving the unremitting attention of the committee of the Council charged with the direction of the undertaking. But that could have been said with truth at any time since the Council began to direct the tramway policy of London. The present condition is not the result of neglect either on the part of the committee or the management. The amount of organised work devoted to the undertaking by members of the Council has never been stinted; and it has been loyally led and seconded by the management. Yet a real success has never been achieved. The tramways have proved an immense boon to the people; but it is doubtful whether the maximum of service of which they are capable has been obtained from them, and it is indisputable that the financial results are unsatisfactory. It is true that the tramways have been constructed at great expenditure, but the ratepayers have obtained good value for their money. There have been some mistakes in equipment, but many of these could not in the circumstances have been avoided. In fact, they were not mistakes, but are made to appear so only by improvements in design and construction of later date. On the whole, the engineering and constructional work will bear any scrutiny that may be given to it. The chief difficulties that have always confronted the operators of the system have been its configuration and the pressure on financial policy exercised by political influence. The latter is not easily discernible, but it has been specially responsible for injudicious arrangements as regards fares. Earnings are, in fact, the crux of the whole matter. Operating expenses are not unsatisfactory; considering the conditions that now prevail in London, to work large double deck cars at an

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average cost per mile of 7·85d. is excellent. What is needed is an increase of revenue; and when it is remembered that the Council has the best tramway area in the world, the conclusion can hardly be resisted that this area has not been worked to the best advantage. Clearly the ratepayers of London are justified in demanding that the undertaking shall be put on a better financial basis. We believe that it can be done as soon as the Council treat the undertaking in the same way as a board of directors would treat a business for which they are responsible. The members of the latter might have various views as to the subsidiary aims of their company, but they would be unanimous in their determination first of all to put their undertaking on a satisfactory basis. Because the Council and not a company own the tramways is no excuse for granting unremunerative fares. "Let every passenger pay for his ride and get full value for his money" was the maxim of one of our most successful municipal tramway administrators, and that sound and simple rule, wisely acted upon, would of itself materially relieve the situation in London. More thorough study of traffic requirements and greater attention to the convenience of the public in various parts of the tramway area would undoubtedly also help the revenue. To enable this to be done to the best advantage, some changes in the working of the tramway department will probably be necessary. Decentralisation and devolution are the watchwords of success in all large modern businesses. Wisely to divide responsibility is to awaken new power and to bring fresh effort to any enterprise. London transportation is an industry so complicated and so diversified that no official charged with general supervision can have any time for routine duties. His work should be to organise and to instil driving force into the whole undertaking. General lines of policy having once been determined by the committee, the responsibility and authority for carrying out that policy should be left with the executive head; and references to full committees should be confined as far as possible to important departures. The war is teaching us many important lessons, and it is time that the Council's tramways shared in the advantage that is being derived from them.

GOODS TRAFFIC ON TRAMWAYS.

To the Editor of THE TRAMWAY AND RAILWAY WORLD.

Sir,—We are all too busy to go into much detail on controverted questions, but you will perhaps allow me a word on Mr. Sellon's reference in his letter in your issue of November 9 to my part in the discussion.

He says: "The power to make sidings into any depot or warehouse other than those belonging to the undertaker does not exist under the general law. The authors are quite correct and Mr. Mozley is wrong."

Mr. Sellon suffers from the disability of not being a municipal tramways manager, otherwise no such idea would have crossed his mind. There is no power under the general law for a Corporation to work tramways at all, hence the power to make sidings could only be present in our minds in connection with special Acts, which all of us must obtain before we can work either passenger or goods traffic—clearly I was referring only to our special Act here which gives the power to make sidings to private works—it would be absurd to obtain power to carry goods traffic without means to carry it into effect.

I think it is quite fair to quote against Mr. Sellon a recent criticism in *The Times*:—"Refutation of statements attributed to an antagonist but never made by him."

I can only say one more word, and that is to recommend him to study the psychology of Local Authorities from the inside, without which he will always be unable to understand why municipal and company associations cannot coalesce.—Yours faithfully,

HENRY MOZLEY.

Burnley.

SPECIAL CAR TRAFFIC MAY BE PROHIBITED.

The *London Gazette* of November 24 contained the following addition to the Regulations made under the Defence of the Realm Act:—

RAILWAYS AND TRAMWAYS.

"9F.—(1) The Board of Trade, or, in Ireland, the Chief Secretary, may by order prohibit on any railways (including tramways) any traffic named in the order, being excursion traffic or traffic for special purposes, and the provision of any special facilities for any such traffic.

"If any person, in respect of any traffic so prohibited, acts in contravention of any such order, he shall be guilty of a summary offence against these regulations.

"(2) Any such order may be made so as to apply generally, or to any special railway, or any special traffic.

"(3) This regulation shall not apply to any railways over which His Majesty has control by virtue of a warrant under Section 10 of the Regulation of the Forces Act, 1871."

The Board of Trade on November 28 issued a communication in which they state that the increasing demands made by the war on the resources of the railway companies necessitate that every person who proposes to travel should consider whether it is really necessary that the journey should be undertaken. The Board desire to impress upon all traders the urgent importance of taking every step in their power to avoid delays to wagons, both in loading and unloading. The saving of a day all round means in effect a substantial addition to the rolling stock of the country. Economy and despatch in the use of sheets for covering wagons is also of great importance.

L. & N.W. Railway Electrification.—By an oversight the name of the makers of the main switchgear was omitted from the article on the electrification of the suburban lines of the London and North Western Railway which appeared in our issue of November 9. The main station switchgear for controlling the turbo-alternator plant in the Wembly power-station, six 1,000-KW. and twenty-five 750-KW. rotary converters for use in sub-stations, was supplied by the British Thomson-Houston Company, Limited.

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TRADE AFTER THE WAR.

The Government continue merely to mark time so far as any action for organising and promoting trade after the war is concerned. They profess still to be waiting for reports of various Committees. But some members of the Government have practically admitted that they will not take action until forced by public opinion, and in this matter public opinion needs to be formulated by the nation's leaders. Unless those leaders make up their own minds, and have the strength of their convictions, it is to be feared that no effective action will be taken. It is true that opinion among the manufacturing, producing, and commercial community is very strong, but to be effective it must be organised much more effectively than it is at present, if it is to be applied to the Government with good results.

Mr. Asquith, in reply to a question in the House of Commons in the latter part of November, stated that an interim report by Lord Balfour's Committee has been received by the Government. This, it will be remembered, is the general Committee, as compared with the sectional ones dealing with individual industries. The duty laid on Lord Balfour's Committee is to report what industries are essential to the future safety of the nation, and what steps should be taken to maintain or establish them; how to recover home and foreign trade lost during the war and to secure new markets; to what extent the resources of the Empire can be developed; and how the sources of supply within the Empire can be prevented from falling under foreign control. Presumably the findings of the sectional Committees will be at the disposal of Lord Balfour's Committee. Meantime it has been stated that the interim report of the latter body recommends as a temporary measure the prohibition of imports from enemy countries for a short period after the end of the war. This does not carry matters very far, and the Committee have evidently a long way to travel—meaning more time. It has been alleged by some of the political writers in the daily Press that the Committee have been blocked in all their efforts to get materials for discussing a positive fiscal policy by the opposition of the permanent officials of the Government departments. Official obstruction to change is a well-known feature of public life, but it would be very strange if a large and influential Committee appointed by the Government for a specific purpose cannot get over difficulties of this kind. But the trouble is that time is passing. The war is not going to last for ever, and it is of the first importance that proper schemes for action should be drawn up and ready for operation. Indeed, we should be ready for effective action in various directions before the end of the war. Much could be done even now.

It must further be recalled that according to the Government programme their consideration of the final report of Lord Balfour's Committee is only to be a preliminary step. After that an Imperial Conference representing Great Britain and the Dominions is to be called, when it is hoped that an Imperial policy—based, there is reason to hope, on the principles laid down in the resolutions of the Paris Conference—will be arrived at. In fixing such a policy the opinions of our Allies will no doubt have to be taken into consideration. It can thus be seen how great is the need for a driving force of public opinion behind the Government if we are not once more to find ourselves in the position of being too late.

The British Empire Producers' Organisation, of which the Right Hon. W. M. Hughes, Prime Minister of Australia, is president, is one of the bodies to which we may look for driving force. Its monthly reports, to which we have alluded in previous issues, indicate that much useful work is being accomplished. The number of associations affiliated to the organisation continues to grow. More work has so far been done in connection with the sugar industry than with some others, as the first start was made in connection with sugar production and refining. The Council have decided that provincial committees should be formed with such centres as Birmingham, Manchester, Liverpool, Glasgow, etc., and that committees should also be formed for the Dominions. We notice with satisfaction that among recent additions to the Council is Mr. W. R. Rutherford, who will represent British engineering. Preliminary negotiations have been opened for the formation of a chemical manufacturers' section. Inquiries in regard to the organisation should be addressed to the General Secretary, Sir George Makgill, Bart., 2, Hatton Court, Threadneedle Street, London, E.C.

In reference to the meeting at the Mansion House, London, on September 20 last, organised by the British Electrical and Allied Manufacturers' Association, the report to which we are referring says:—

> As an outcome of this meeting, negotiations have been instituted with a view to closer co-operation between several associations there represented. The feeling of the Executive Committee of the organisation is that the time is ripe for an effort towards unification of the various attempts to organise different provinces of industry and trade. It is clearly to the advantage of the nation and the Empire that overlapping should be avoided, and that the work of various bodies with similar aims should be co-ordinated with a view to their showing a united front, now and after the war, not only to enemy countries but to opponents of a national trade policy in the United Kingdom.

This puts tersely and forcibly the immediate duty which we have frequently urged upon those who are concerned with the progress of trade and industry, and we are glad to see the attitude now taken by the Producers' Organisation. A wise co-ordination would possibly be even more valuable than a complete unification. It is no unusual thing to see in the case of new movements the formation of a number of overlapping agencies, followed by a co-ordination or consolidation. We hope to see the same process here.

By way of a footnote to the action of Manchester Chamber of Commerce in discarding its old free trade theories and coming into line with other Chambers, we may put on record here that the Manchester Chamber has since decided that no German, Austrian, Bulgarian, or Turk who has been naturalised since August, 1904, shall be eligible for membership of the Chamber.

The Marquis of Crewe announced on December 1 to a deputation from the Board of Scientific Societies that the Government have decided to institute a new and separate Department for Scientific and Industrial Research. Two members of the Institution of Mechanical Engineers have given a handsome donation to be devoted to industrial research, and it is hoped their example will be followed by others. The Government propose to devote a large sum for the next five years to the aid of research work carried on by various industries. Associations will be formed for the purpose. Expenditure by manufacturers on research will be reckoned as working expenses, and so will not be subject to income-tax. In order that funds may be held by the new Department a Royal Charter of Incorporation has been granted to the official members of the Committee of the Privy Council for Scientific and Industrial Research, under the title of the Imperial Trust for the Encouragement of Scientific and Industrial Research. Mr. H. Frank Heath, C.B., has been appointed secretary of the new Department. This is a very large and important permanent scheme and as such it will doubtless take time to develop.

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THE LATE SIR GEORGE WHITE.

It is with deep regret that we record the death of Sir George White, Baronet, which occurred suddenly at Bristol on November 22. His multifarious activities endured to the end, but it may truly be said that his great enterprises had come to fruition and he could see of the travail of his soul and be satisfied. Born in Bristol in 1854, he began life as a boy in a solicitor's office, rose considerably in the legal profession, abandoned it for that of a stockbroker, then was financially interested in railways and tramways, became a pioneer of electric traction in this country, developed great tramway undertakings, and in later years founded and developed a great aeroplane construction establishment which has been of much value in the present war. Add to these things the fact that he was a prominent citizen of Bristol, taking an active part in local philanthropic work, and we have an all-round example of beneficent activity coupled with a business ability which amounted to genius.

Here we can refer only to Sir George White's achievements in matters relating to traction. It was while he was still concerned with the law that he became interested in tramway business. Between 1872 and 1874 he was a legal representative of the Bristol promoters of Bills for the construction of the first tramways in that city. There was, of course, opposition before the Parliamentary Committees, but the Bills got through, and the first tramcar, drawn by horses of course, was soon an actuality in his native town. The success of his work was marked by his appointment as secretary of the tramway company, and after that he abandoned the law and became a stockbroker in addition to his tramway business. His continued interest in the stockbroker's profession was marked many years afterwards when he devoted a part of the fortune he had made to the erection of a new Bristol Stock Exchange building, which he handed over as a gift to the Exchange authorities.

The Imperial Tramways Company, mainly a "holding" concern, was the instrument through which Sir George White chiefly worked for the development of his schemes. It held shares in the Bristol Tramways Company—whose capital has risen from £7,000 to about a million and a quarter sterling—and in many other tramway companies then in a more or less rudimentary or moribund condition. His connection with the Imperial Tramways Company dates from 1890. He and his friends acquired a controlling interest in the company about 1893, and soon a revolution began. The moving spirits were Sir George White, his brother Mr. Samuel White, and the late Sir J. Clifton Robinson. The latter had been traffic manager of the old horse lines, but had left for the United States. He spent a few years there during that fruitful period when electric traction was beginning to develop rapidly. Returning to this country about 1892, full of enthusiasm for the new development, he placed his views before Sir George White. Then came the pioneer work of electrification of various line in which the Imperial Company was interested. The progress can in brief be best indicated by the dates when the first electric routes on each system were opened. There were :—Bristol, October, 1895 ; Dublin, May, 1896 ; Middlesbrough, July, 1898 ; and London United, April, 1901. These systems taken together extend to about 150 route miles and carry the enormous traffic of which our readers well know.

The results were not attained without strenuous work. Apart from the financial arrangements, Sir George and his colleagues had to overcome a sea of prejudice and the opposition of local authorities and of various other interests. It cannot be doubted that it was the success of these undertakings which hastened the action of municipalities in coming into the field. In the development especially of the Bristol and London United systems Sir George White took a leading part on the boards of directors. In recent years the Bristol undertaking has been augmented by extensive services of motor omnibuses and chars-a-bancs.

In 1902 a fusion of interests took place between the London United Tramways Company and the Underground Electric Railways Company of London so as to secure a free interchange of traffic. Sir George White relinquished the chairmanship of the London United Company in 1903. In the following year a baronetcy was conferred on him. The title descends to his only son, Mr. George Stanley White.

Mention should be made of Sir George's activities in connection with railways. He took a prominent part in reforming the Taff Vale undertaking in 1889. He also took a lead in the arrangements for the acquiring of the Bristol and North Somerset Railway by the Great Western Railway in 1885, of the Bristol Port Railway and Pier by the Great Western in 1890, and of the Severn and Wye and Severn Bridge Railway by the Midland Railway in 1894.

Mr. Charles Challenger, well known in the traction field as traffic manager of the Bristol Tramways and Carriage Company, who was for many years associated with Sir George White, in giving some reminiscences to the *Western Daily Press* of his late chief, bore emphatic testimony to the fact of Sir George's solicitude at all times for the welfare of the Bristol Tramways employees and those of other undertakings with which he was associated. In his death the tramways employees had lost a sympathetic friend and benefactor.

MOTORMEN'S GALLANTRY UNDER FIRE.

Apparently the occupation of a motorman constitutes a good training for the field of battle. Certainly the motorman has to exercise alertness and promptitude of decision and action. These attributes are conspicuous in the gallant deeds for which two motor men are recorded as receiving military decorations under our heading "With the Forces." Their deeds were so markedly brave that we set them forth here individually, though no doubt the recipients of the decorations would disclaim having done anything beyond discharging the soldier's duty.

The deeds that secured the Military Cross for Regimental Sergt.-Major J. R. Jones, who enlisted from the West Ham Corporation motormen, are thus described in the *London Gazette* :—"When the battalion was heavily shelled at Richebourg L'Avone on January 4, 1916, during which R.S.M. Jones's batman, who was standing next to him, was killed, he showed great coolness in going round the lines steadying the men. Again, at Festubert, on March 24, 1916, when one of the companies was subjected to a sharp bombardment by 5·9 howitzers, R.S.M. Jones rushed from battalion headquarters to the scene. He found that a Lewis gun emplacement had been destroyed and some of the team killed and wounded. He quickly cleared the area of our men, and had the wounded brought out of danger, the Lewis gun being also brought out undamaged. His conduct under fire has been a fine example to all ranks on several occasions."

Sergt. T. Jones, of Cardiff Corporation Tramways, is the other hero referred to. He was introduced to the City Council on November 9 by Sir John Courtis, chairman of the Tramways Committee, as an old employee who had served both as a conductor and a motorman. In handing the military medal with bar to the gallant sergeant, the Lord Mayor expressed the pride that he felt in starting his year of office by helping to honour a brave man. Sergeant Jones had twice distinguished himself, and had now not only the Military Medal, but also the bar. One of his gallant acts was to reorganise his platoon, which had become scattered, and to continue an assault, and afterwards to help bring in wounded under heavy fire. They were proud of Sergeant Jones.

London Electric Railway Extension.—It is expected that the running of through electric trains between the Baker Street and Waterloo Railway and Watford on the London and North Western Railway will be begun early in the new year. Owing to the war, there is delay in the completion of the joint rolling stock, but pending this some of the London underground electric railway companies will give the use of some of their spare stock for the purpose.

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SPARE PLANT IN GENERATING STATIONS.

The unfortunate experience of the Birmingham Corporation Tramways department in having to curtail the service daily for a considerable period, owing to the inability of the electricity undertaking to supply sufficient energy, has an interest for other tramway authorities who are dependent upon one station for the two departments. In consequence of the increased demand due to war work that has arisen in most towns, and the difficulty of obtaining extra plant during the present crisis, the question of the amount of spare plant available has become one of great importance. The position of some of the leading municipalities and companies is indicated in the appended table :—

	Maximum demand.	Plant capacity, kw.	Spares, kw.	Percentage of spares.
Glasgow	50,000	54,550	4,550	9%
Birmingham ...	33,000	41,505	8,500	25%
Edinburgh	11,400	20,390	8,990	80%
Dundee	7,014	16,500	9,486	120%
Leeds	16,700	26,600	9,900	60%
Liverpool	23,511	44,600	21,089	90%
Manchester	49,897	57,300	7,403	17%
Sheffield	23,618	26,000	2,382	10%
Companies.				
Charing Cross ...	12,664	26,480	13,816	100%
Central	10,443	19,695	9,252	90%
Chelsea	19,739	30,000	10,261	50%
City of London ...	13,700	20,300	6,600	50%

The above figures were included in a report presented to the Glasgow Electricity Committee by Mr. Lackie, their electrical engineer, in connection with a recommendation that an extension of the plant should be carried out. The committee decided to proceed with the fourth part of the Dalmarnock scheme, representing an addition of about 40,000 H.P. of plant. It should be noted that Glasgow is one of eighteen places that have separate stations for the tramways and electric supply departments.

A New Station for Sheffield.

Sheffield Electric Supply Committee recommend that Sir Alexander Kennedy be asked to advise on a proposal for a new generating station. As the result of the continuously increasing demands for energy for the tramways, the committee have resolved to acquire land in the east district and to erect thereon a sub-station. Contracts will be placed for two rotary converters, switch gear, cables, etc., the total cost (including the buildings) being estimated at £8,000. The Corporation have adopted the foregoing proposals.

Critical Outlook at Belfast.

Belfast Corporation on November 3 authorised the Tramways and Electricity Committee to take up the matter of extending the electricity works and to submit a complete scheme, part of which could be put in hand as soon as the Treasury sanction the expenditure. This decision was arrived at in consequence of Mr. T. W. Bloxam, the city electrical engineer, having reported that the lighting, power, and tramways demand during the coming winter, when the whole of the 13,300 KW. plant installed is running simultaneously at its full normal rating, would leave a margin of about 11 per cent., distributed over the three systems. He considered that the margin should be at least 25 per cent. The largest generators had a capacity of 1,500 KW., so that the margin disappeared if one of these required to be laid off during the evening load. Conditions favourable to allow of getting full normal rating from every engine simultaneously seldom obtained in central stations. These circumstances led him to anticipate a shortage of energy during November or December of this year, and a more pronounced shortage next year, as he saw very little possibility of increasing the plant by then. The effect of this shortage would be a diminished brilliancy of the lighting, motors giving less power, and tramcars slowing down between the hours of 4 and 5.30 p.m., unless the shortage was sufficiently serious to stop the cars altogether. The Corporation also approved of a circular being sent to users of electricity, thanking them for the manner in which they had met the committee last year in reducing their demands between the hours of 4 o'clock and 5.30 in the afternoons of November and December, and asking them to make a similar reduction this year.

Board of Trade and Fuel Economy.—Mr. F. Ayton, borough electrical engineer and tramways manager at Ipswich, in his annual report on the working of the electricity department, refers to the ash contents of the coal as amounting to the high figure of 20 to 23 per cent., and he suggests that as the ashes use up railway accommodation and fuel for haulage, the Board of Trade Committee dealing with coal saving might be better employed in looking into the working of the collieries rather than adjuring electric supply undertakings to reduce their consumption by methods that will not produce the result aimed at.

GARCKE'S MANUAL.*

"Bigger than ever, better than ever," must be the verdict of every man in the electrical industry when he turns over the pages of the new volume of the familiar "Garcke." Owing to the difficulties attending the production of industrial records in present circumstances, there has been some delay in the production of the book this year, but advantage has been taken of the extended period to include accounts and other particulars to a later date than was possible in former volumes. It has been found possible to include nearly all the statistical tables which summarise the progress of the electrical industry. The main fact which they reveal is the largely increased service which the electrical industry has rendered, although only a moderate amount of fresh capital has flowed into it. In fact, the marginal capacity of supply undertakings has been encroached on by the necessities of war.

The main portions of the manual are as usual occupied by the full essential particulars of all the electric supply, traction, telegraph, telephone, manufacturing, and miscellaneous electrical undertakings in the British Empire. The directory now includes over 20,000 names and addresses of officials connected with electrical undertakings and others concerned in the industry.

Among the special articles grouped under the "Progress of the Year" section are those dealing with the Underground Railways pooling scheme, the report of the Advisory Committee of the Board of Trade on "Electrical Trade after the War," electrical imports and exports for the years 1910 to 1914, the report of the Home Office Committee on the "Lighting of Factories and Workshops," a list of electrical and allied firms ordered to be wound up under the Trading with the Enemy Amendment Act, 1916, and the highest and lowest prices of electrical investments for several years. A special summary of electrical exports to various countries for the year 1913, and particulars of the capital, profits, etc., of all the leading German electrical and allied companies have been included. These two last-named items have been prepared by the export department of the British Electrical and Allied Manufacturers' Association.

This year the supplements include a large map (36 in. by 20 in.), issued separately, showing the location of the lighting, power, and traction undertakings in the United Kingdom, a large map of the areas of electric supply undertakings in and around Greater London, a large map of the electric railways in London and district, and maps of nearly fifty traction and supply systems.

By way of illustrating the growth of the industry, a few comparative figures may be quoted. The first volume of the manual, published in 1896, contained particulars of 200 undertakings; the present volume deals with 2,650. In the former year the aggregate capital issued by electrical companies registered in Great Britain, together with the amounts borrowed by municipalities for electrical undertakings, was in round figures £61,000,000; this year it is £481,000,000.

The usual interesting statistical tables showing tramway development over a period of years are given, but as the issue of the Board of Trade tramway returns has meantime been suspended, it has not been possible to give the figures for last year.

Speaking generally, the compilers of the manual are again to be congratulated on the success of their arduous task. The work of the printers and of the engravers of the maps has again been excellently done. Convenience of reference, accuracy, and fullness of information make "Garcke" indispensable for all concerned in the great and growing electrical industry.

TRAMWAYS AND INSURANCE.

An announcement was made at the annual meeting of the Provincial Tramways Company, Limited, by Mr. Andrew Beattie, the chairman, that insurance against raids had cost £732. He also called attention to an item of £12,000, which was the reserve account for third party insurance or other purposes. They started that account three years ago, and had added to it year after year. At the time when they opened that fund the directors considered, having regard to the excellent position of the company and the good management, that later on they might be in the position of undertaking their own insurance, but now, although they had that money, they had, if he might say so, scarcely the heart to carry out their own insurance. They had had one or two accidents—by no means alarming accidents—but still the directors considered that, from a prudential standpoint, it was probably better that they should wait for another year or two before beginning to undertake their own insurance.

* Manual of Electrical Undertakings and Directory of Officials, 1916-1917. With which is incorporated the Imperial Directory, and statistics of electric lighting, power, and traction works in operation or projected in Great Britain and Ireland, India, and all British Colonies. Compiled under the direction of Emile Garcke, M.I.E.E., F.S.S. Volume XX., 2,000 pages, demy octavo. London: Electrical Press Limited, 13-16, Fisher Street, Southampton Row, W.C.

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THE PREVENTION OF STREET ACCIDENTS.

"Safety First" Council Formed for London.

On December 1, in the Caxton Hall, Westminster, an important conference of London local authorities and other bodies was held, and it agreed to the formation of a "Safety First" Campaign Council for the purpose of carrying on propaganda and educative work among the public, with the object of reducing the number of street accidents to pedestrians. The conference was called by Mr. H. E. Blain, operating manager of the London General Omnibus Company, whose work during the past year in promoting the safety movement in connection with the company is well known. The interest which is taken in Mr. Blain's proposal was shown by the fact that representatives of no fewer than 44 local authorities in the metropolitan area attended, and numerous other bodies also took part.

The following were the metropolitan boroughs each represented by several delegates, in many cases including the mayor:—Camberwell, Deptford, Greenwich, Hackney, Hammersmith, Hampstead, Islington, Kensington, Lambeth, Lewisham, Paddington, St. Marylebone, St. Pancras, Shoreditch, Stepney, Stoke Newington, Westminster, and Woolwich.

The extra-metropolitan boroughs represented were:—Bromley (Kent), Ealing, West Ham, Croydon and Richmond.

The urban district councils were: Barking, Beckenham, Bexley Heath, Bushey, Chislehurst, Chiswick, East Barnet Valley, Edmonton, Enfield, Esher and the Dittons, Finchley, Heston and Isleworth, Ilford, Leyton, Loughton, Sidcup, Sutton, Teddington, Watford, Walthamstow, and Willesden.

The following railway companies were represented by the gentlemen mentioned:—Midland Railway, Mr. J. Pepper; London, Brighton and South Coast Railway, Mr. White; London and South Western Railway, Mr. F. V. Milton; Metropolitan Railway, Messrs. W. Holt and J. Wardle; Great Northern, Great Eastern, and Great Central Railways, Mr. F. Saward; Underground Electric Railways Company of London, Mr. W. E. Mandelick.

The omnibus and cab companies were:—Associated Omnibus Company, Mr. F. Willing Tibbs; Thos. Tilling, Mr. F. Duke; National Steam Car Company, Mr. Clarkson and Mr. D. Smith; British Motor Cab Company, Mr. T. W. Ashwood.

The tramway authorities and their representatives were:—South Metropolitan Tramways, Mr. A. V. Mason, manager; London United Tramways, Mr. J. B. Mackinnon, traffic superintendent; Walthamstow Council Tramways, Mr. W. Murray, manager; Ilford Council Tramways, Mr. L. E. Harvey, manager and engineer; East Ham Corporation Tramways, Mr. E. C. Ullman, manager; Croydon Corporation Tramways, Mr. T. B. Goodyer, manager; Metropolitan Electric Tramways, Mr. W. E. Hammond, traffic manager.

The following associations were represented:—Automobile Association, Commercial Motor Users' Association, Tramways and Light Railways Association (Mr. W. Tuke Robson and Mr. A. de Turckheim), Roads Improvement Association, London and Provincial Union of Licensed Vehicle Workers, Amalgamated Association of Tramway and Vehicle Workers, National Union of Vehicle Workers, and the London Cartage Contractors' Association.

The Metropolitan Police were represented by Superintendent Bassom, and the City of London Police by Inspector John James. Mr. Maxwell attended for the Local Government Board. Twelve firms and companies carrying on parcel delivery work, etc., in London, also sent representatives.

Mr. Blain, who presided, in opening the proceedings expressed his great appreciation of the exceedingly representative character of the gathering. It had been with some diffidence that he and his colleagues had ventured to convene this conference, and he could have desired that it might have been convened by representatives of the local authorities. Before venturing to send out the circular of invitation he had interviewed a number of the mayors and leading municipal officials in the metropolitan area, partly to enlist their sympathy and partly to consult them with regard to the proper person to convene this conference. It was on their representations that he had taken the liberty to call this meeting. He was connected with companies who conveyed 971,000,000 passengers per annum and who were deeply concerned in anything affecting street safety. They had a hope and belief that by co-operative effort something might be done to assist the general public in the problems arising from the darkened streets and war conditions. They would have noticed with great regret the alarming increase in the number of fatal street accidents in London. In the first nine months of 1914 these reached 411. That number had grown to 577 for the corresponding period of this year. The street accidents of all descriptions in the latter period totalled 34,575. These figures were very serious and necessitated the careful consideration of everybody concerned with the administration of public thoroughfares and street traffic in London. His company had for some time, by announcements in the public Press, by legends on the omnibuses, and by displayed advertisements in the railway stations, endeavoured to direct the attention of the public to "safety first" and to awaken the minds of the public to the fact that precautions which were ample in normal times were quite insufficient now. As the result of that campaign, both among their own employees and the general public, they had succeeded in reducing the number of accidents in which their omnibuses were involved by no less than 25 per cent. as compared with last year. (Applause.) He was sure that all present were at one in the desire to co-operate in anything which might be done to improve public safety. In the circular convening this conference his company suggested that the time was ripe for the formation of a Council whose sole duty would be to endeavour by educative and other means to do something to improve the present conditions. It was suggested that if a council were formed with various sub-committees it might be able to undertake definite educative and publicity work. The circular also suggested several means of awakening public attention. The first was courses of instruction for traffic and transport employees. He did not want that to be misunderstood. So far as public vehicles were concerned, the drivers had to be trained. The majority of them had to be passed and licensed by the police. That did not apply, however, to many who were operating, perhaps for the first time, carts and other vehicles. He thought that if there could be established a common centre in some hall where these men might have an opportunity of seeing films showing the dangers of the streets, of being impressed with the necessity of observing more closely the rule of the road, etc., very distinct good would result. The next paragraph in the circular referred to street traffic. Some boroughs had done a great deal in the provision of refuges in the centres of the streets. All had not done so, and it was thought a common survey of this important matter by a committee of surveyors and others experienced in the subject would be of distinct usefulness. Street lighting they must probably refer to with bated breath, but there were people who believed that even there a scientific consideration of the lighting problem might do something to improve the conditions. (Applause.) Then if there were an educational and publicity committee, that also would assist in bringing the problems to the minds of the public of the school children as well as of the other users of the highways. Pictorially and by Press advertisements and by many other means, it was possible to direct public attention to this very important matter. Then it was thought that to supply free to cinema theatres for exhibition a few short films showing street dangers would produce that graphic grasping of the mind of the public and of children which any amount of talk failed to achieve. There was a suggestion that there might be held a safety first exhibition, admission to which would be free and at which the subject could be further pursued. Thus there was a great deal that could be done, and if the local authorities on the one hand and street users on the other would co-operate he was certain that the results would be for the common weal. With regard to the financial side, he understood there was an idea from the wording of the circular that this was an ambitious programme which would require a large financial contribution from the local authorities and others. That was not so. Co-operation more than cash was what was needed. The resolutions to be submitted did not involve the raising of any funds from this gathering. That matter would be dealt with later by a circular.

The Mayor of Westminster (Sir George E. Welby) moved the first resolution:—

"That this conference approves of the organisation of a safety first campaign in the metropolitan area."

He said that his Council had for some time been occupied in increasing the number of refuges. The people could move about in the daytime with considerable safety, but it was a very different thing at night. Much could be done by the means now proposed.

Mr. W. Joynson-Hicks, M.P., chairman of the Automobile Association, in seconding the motion, said that the war had put back civilisation for a century or more so far as street lighting was concerned. Civilisation in our cities meant light and rapidity of traffic. Through street accidents not only individuals but the body politic suffered. He was one of those who did not believe in the necessity for the extreme darkness of the streets. (Applause.) He had discussed the matter with many flying men, and he did not believe that the extreme darkness was of any real use in keeping off those wretched visitors who sometimes tried to attack us. He hoped that those who were responsible would reconsider the question and see whether there could not be a little more light, so that the safety of the lieges might be more pronounced. In attempting to secure safety there should be a partnership between the vehicle driver and the pedestrian. It was with the utmost difficulty that the traffic of London was carried on, and vehicle drivers were entitled to ask foot passengers to exercise the utmost possible care. There was much to be said for women wearing white hats at night, and all kerbs should be whitened. The education authorities should join in the campaign, as many hints could be given to children as to the mode of crossing the street. They should also be instructed not to hang on to vehicles.

Mr. J. C. Hammond, chairman of Walthamstow Urban District Council, in supporting the motion urged that there should be uniformity in the lighting all over the metropolis.

Mr. Ben Smith, organising secretary of the London and Provincial Union of Licensed Vehicle Workers, urged the necessity for

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uniformity in the system of lighting vehicles. The brilliant lights allowed on private motor cars blinded the drivers of other vehicles.

The resolution was carried unanimously.

The MAYOR OF DEPTFORD (Mr. W. A. Weyland) moved :—

"That a London Safety First Campaign Council be now elected, with power to co-opt additional members, to establish an adequate organisation and to take all necessary steps, by the appointment of committees and any other means to bring the scheme into prompt operation."

He hoped the council would make suggestions as to the lighting of the streets, which was in a chaotic state. When they considered the great number of people killed and injured in street accidents they might ask themselves whether the game was worth the candle.

Mr. H. GORDON SELFRIDGE, of Selfridge and Company, seconded the motion and it was unanimously adopted.

The CHAIRMAN said that he would suggest a basis for the council something on the following lines :—Two representatives of each local authority, one being a public representative and one an officer, a representative of each tramway and omnibus undertaking, a representative of each association, a representative of the railway companies having street goods vans, etc., a representative of the Metropolitan Police, a representative of the City of London Police, a representative of the motor cab industry, and several representatives of private firms.

It was pointed out that the members of local authorities present had no power to appoint representatives of those bodies, and on the motion of Alderman J. J. Bisgood, Richmond, it was agreed to refer to the bodies represented at the conference the appointment of their representatives to the council. It was also decided that associations of teachers should be approached with a view to their joining in the movement.

On the motion of Mr. THOMAS WATSON, chairman of Marylebone Electric Supply Committee, it was agreed that the following should act as hon. secretaries of the new council *pro tem.* :—Mr. H. E. Blain, representing the traffic authorities ; Mr. A. P. Johnson, town clerk of Hampstead, representing the civic authorities ; and Mr. A. E. Cave, editor of the *Municipal Journal*, representing publicity interests.

The CHAIRMAN, in reply to a question, said that the London County Council had not taken part in the conference, the clerk having written that while the County Council were in sympathy with the object in view, they felt diffidence as an executive body in sending representatives.

The proceedings closed.

PRIVATE BILL NOTICES.

Only two notices of Private Bills relating to traction matters for the ensuing session of Parliament appeared in the *London Gazette* of November 21. Particulars are appended.

EBBW VALE COUNCIL OMNIBUS BILL.—To provide and run motor omnibuses and to establish a garage, etc. Parliamentary agents, Messrs. Lees and Company, Palace Chambers, Westminster.

BEDWAS AND MACHEN COUNCIL OMNIBUSES.—A bill containing similar provisions to those contained in the notice of the Caerphilly Council. Solicitor, Mr. C. Davies Jones, Bedwas, Mon.; Parliamentary Agents, Messrs. Lees and Company, Palace Chambers, Bridge Street, Westminster.

ASHTON-UNDER-LYNE CORPORATION TRAMWAYS AND OMNIBUSES.—To purchase the undertaking of the Oldham, Ashton, and Hyde Tramways, to provide and run motor omnibuses within and without the borough, and to acquire lands and erect buildings therefor. Parliamentary Agents, Messrs. Sharpe, Pritchard and Company, Palace Chambers, Westminster.

CAERPHILLY COUNCIL OMNIBUS SERVICES.—To provide and work omnibuses worked by mechanical or animal power in Caerphilly and with consent in the Urban Districts of Bedwas and Machen, and to enable the Council and the Bedwas Council to enter into agreements with reference to working, leasing, etc., with any authorities, companies, or persons providing or running omnibuses in any district of Glamorganshire and Monmouthshire. Solicitor, Mr. W. Speckett, clerk to the Council ; Parliamentary Agents, Messrs. Rees and Freres, 5, Victoria Street, Westminster.

NOTTINGHAMSHIRE AND DERBYSHIRE TRAMWAYS COMPANY.—To empower the company (1) to purchase and acquire and to sanction and confirm the transfer to and vesting in the company of the Ilkeston Corporation Tramway undertaking, together with all the powers, rights, duties, authorities, and privileges conferred or imposed by the Ilkeston Corporation Tramways Order, 1899 ; (2) to make provision for the payment by the company of the purchase price and for the application thereof by the corporation ; (3) to constitute the tramways and works part of the undertaking of the company, to extend and apply thereto all or some of the powers conferred upon the company by the Nottinghamshire and Derbyshire Tramways Acts, 1903, 1906, 1908, and 1911, and the enactments incorporated therewith respectively ; (4) to extend the time limited by section 43 of the Tramways Act, 1870, for the re-purchase by the Corporation of the tramways and undertaking authorised by the Order of 1899 ; and (5) to empower the company and any local authority, company, body, or person owning or working any tramways or light railways which can be worked in connection with the tramways of the company to enter into and carry into effect agreements for the sale or transfer to the company of such undertaking. —Parliamentary Agent, Mr. J. Kennedy, W.S., 25, Abingdon Street, S.W.

MYNYDDISLWYN COUNCIL OMNIBUS SERVICES.—To empower the Mynyddislwyn Urban Council, with the consent of the Bedwellty, Abercarn and Risca Urban Councils, and of any other local and road authorities affected, to (1) provide and run omnibuses worked by mechanical and/or animal power ; (2) to take fares and charges in respect of passengers, parcels, animals, and goods, to purchase lands and construct depots, sheds, garages, to lop trees along the routes, to provide shelters and waiting-rooms, and for that purpose to use any part of any street, park, or open space, to demise to any person, company, corporation, or authority their omnibus undertakings, or any part thereof ; (3) to empower the several councils or any of them to enter into agreements with respect to the provisions of the intended Act, and to authorise the council and any authorities, companies, or persons providing or running omnibuses in any other district adjoining or adjacent to the district to enter into agreements for or with reference to the working, running, leasing, management, and maintenance of any omnibus service of the contracting parties, etc. ; and (4) to authorise the council to borrow money for any of the purposes of the intended Act.—Solicitor, Mr. T. C. Griffiths, Blackwood, Monmouthshire ; Parliamentary Agents, Lees and Company, Palace Chambers, Westminster.

EXCESS PROFITS TAX.

INCREASE OF STATUTORY PERCENTAGE GRANTED.

The Board of Referees have issued the following Order, dated October 26, 1916, on the application of the Tramways and Light Railways Association for an increase in the statutory percentage of profit before the Excess Profits Tax becomes payable on the business of tramways and light railways in Great Britain and Ireland :

The Tramways and Light Railways Association, whose place of business is at Caxton House, in the City of Westminster, having by Alfred de Turckheim, its Secretary, made application under this Act to the Commissioners of Inland Revenue for an increase of the statutory percentage as respects the trade or business of tramways and light railways in Great Britain and Ireland, where such tramways or light railways are running wholly or in large part over public roads or streets, viz. :—

(1) Tramways authorised by Act of Parliament or of some other mode of authorisation having statutory force to which tramways a power of purchase at stated intervals, as a whole or by sections, by some public authority or authorities is attached ;

(2) Light railways authorised under the Light Railways Act, 1896, or any statutory modification or extension thereof, to which light railways a power of purchase at stated intervals, as a whole or by sections, by some outside authority or authorities is attached ; and

(3) Tramways or light railways leased or agreed to be worked on the terms that the leasing or working company shall provide the whole or part of the rolling stock, plant, or apparatus necessary for working the tramways or light railways, and that such rolling stock, plant, or apparatus may be sold to the owning authority on the termination of the lease or working agreement, or left in the hands of the lessee or person working under the agreement.

And the Commissioners of Inland Revenue having referred the case to the Board of Referees appointed for the purpose of Part 3 of this Act by the Treasury and the Board having heard the applicants and the Commissioners of Inland Revenue by their duly appointed representatives, and having dealt with the case,

The Board doth order that as from the commencement of this Act the statutory percentage as respects the trade or business hereinbefore defined shall be increased to 7½ per cent. in the case of a trade or business carried on or owned by a company or other body corporate and to 8½ per cent. in the case of any other trade or business.

The Order is signed by C. Bine Renshaw, chairman, J. K. F. Cleave and D. du B. Davidson, joint registrars.

Mr. E. F. Vesey Knox, K.C., and Mr. W. Allen, instructed by Mr. Sidney Morse, appeared on behalf of the association.

In our issue of November 9 was published the Order of the Board of Referees increasing the statutory percentage in the case of motor omnibus undertakings to 8 per cent. for a company or other body corporate, and to 9 per cent. in the case of any other trade or business.

British electrical manufacturing companies have received an increase to 7 per cent.

For electrical supply and traction companies in India the percentage is increased to 7 per cent., for companies in Victoria, Australia, to 7½ per cent., and to 8½ per cent. for private firms.

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RESTRICTED LIGHTING AND SERVICES.

REQUESTS FOR LESS DANGEROUS CONDITIONS.

Reports of fatal and non-fatal accidents caused by public service and other vehicles come from all parts of the country during those portions of the month when the moon is not visible. Most of the cases occur on Saturday nights. At Glasgow on November 18 eleven persons were injured by tramcars and four by motor cabs.

Complaints continue to be made all over the country of the danger entailed by the restricted lighting, and at Halifax the Tramways and Watch Committees early in November made representations to the military authorities to secure permission for better car headlights or more light in the streets. On November 16 the Yorkshire Association of Tramway Managers discussed the same question, and resolved to ask the military authorities to receive a deputation. In an effort to secure sanction to a diffused light being thrown on to the road from the headlights of the tramcars, Mr. A. Baker, the general manager of the Corporation Tramways at Birmingham, has drawn the attention of the chief constable to the anomaly of the poor light allowed on the cars and that on motor cars and cycles.

As the result of the attention devoted to the matter at Halifax it is announced that between the rigid darkening of the cars and compliance with the order there seems to be a margin which will allow a slight improvement in tramcar illumination. The outcry has been very pronounced at Manchester, where the chief constable has issued a warning to drivers of vehicles that their speed must not exceed ten miles an hour, and that five miles an hour may be dangerous in many circumstances. As a result of the agitation, the tramways and other committees of Manchester Corporation, on November 22, agreed to have a white band painted on tramway standards and boxes, lamp-posts, trees, and telegraph posts. The kerbs and angles of walls and buildings are to be whitened. Remedial measures as to street lighting have been agreed upon at York, where all lamps, except at a few dangerous corners, have been extinguished during the past two months. Cardiff, Salford, and other towns have also asked for improved lighting. In the metropolitan area there is little complaint, although the public lamps serve now only to mark the division between road and footpath, and the whereabouts of refuges. After 9 p.m. there is little or no traffic citywards, but the outward flow is brisk for two hours later.

In a number of towns the strain thrown upon the motormen night and morning during the weeks when there is no moon, combined with the shortage of drivers, has led to the restriction of the services. Other places are now following suit. On November 15 the Bradford management began to curtail the services by half an hour, and the restriction will be gradually extended to every route. Following a conference between the Newcastle-on-Tyne management and the managers of the places of amusement, the Tramways Committee have altered the time of the last cars leaving the centre of the city to about ten o'clock. At Portsmouth the public have accepted without complaint the innovation of the last cars leaving the temini an hour and a half earlier. With the cars now set free a new service has been put on between the Town Hall and Copnor. The Sunderland car services from November 13 cease at 10.30 p.m. until April 1 next, while Derby has suspended the Sunday running until after the war. Curtailments have also taken place in Leeds, Halifax, Sheffield, etc.

REVISION OF CERTIFIED OCCUPATIONS.

HIGHER EXEMPTION AGES FOR MOTORMEN AND OMNIBUS DRIVERS.

The Press Bureau issued on November 17 a revised List of Certified Occupations (R. 105) and ages of exemption from military service. The reservations contained in the list will be reduced early in 1917 by a further raising of the age limits. At present men in certified occupations, who are under the age limits stated in the list are entitled to be treated as covered by the list if found by a Recruiting Medical Board to be unfit for General Service (Category A). In the next list this arrangement will be altered so as to make available for the army men found fit for Garrison Duty Abroad (Category B, i.). The conditions as to age and marital condition, where applicable, are indicated in the list opposite the several occupations. When an age limit for exemption is stated, the age referred to is the age at April 4 last. Subjoined are the alterations affecting certain public and public utility services :—

	Age at which Reservation begins— Single	Married
Omnibuses—		
Head of department, foreman	30	25
Motor driver	41	25
Tramways—		
Traffic inspector, chief storekeeper, parcel superintendent	30	25
Driver	41	25

Workmen in electrical generating stations (including those for tramways and electric railways) are not affected.

Railway service, including workshops and sheds :—Men to be treated as in a certified occupation in respect of whom the Railway Company have furnished to the Recruiting Officer of the area in which the man resides a certificate stating that he is indispensable to the Company.

OMNIBUSES ON NEW ROUTES.

West Sussex County Council have refused to accept a lower rate than 3d. per omnibus-mile from the Southdown Motor Services, Limited, and the Aldershot and District Traction Company for new services which the companies desired to introduce on county main roads. The latter company wished to extend to Chichester their route now ending at Midhurst. The Southdown Company had asked the Council to reconsider the matter, while the Aldershot Company wrote to the effect that they could not make any payment. A report presented by the Roads Committee stated that at a conference of representatives of the Council with the local authorities of Medhurst, Chichester, etc., it was agreed that 3d. per omnibus-mile be charged for one year, subject to the fares and services proposed being satisfactory, the charge to be subject to revision at the expiration of twelve months, according to the advice of the surveyors after ascertaining the expenses incurred in connection with the maintenance and repair of the highways used by the omnibuses. At the meeting of the West Sussex County Council on November 17, when this recommendation of the conference was adopted, Lord Leconfield said that the omnibuses ran in opposition to the railway companies, who were very large ratepayers and were helping with the upkeep of the roads. There was no question that the vehicles did a very considerable amount of damage to the roads, and the committee had decided that it would be wise to charge 3d. a mile. He had gone into the matter with the surveyor, and found that that charge would not pay for the damage ; they would still have to bear a considerable expense in consequence of this form of traffic. Other counties had, he knew, acted differently. Surrey charged 1d., and Hampshire had not made any charge at all ; but the feeling of the committee was that this was no reason why Sussex should not make the charge.

The Road Board have refused to arbitrate upon a proposal by Camberwell Borough Council that a payment should be made by the London General Omnibus Company for the use of a rural road over which eleven empty omnibuses would proceed morning and night in connection with a new service run to Woolwich at the request of the Ministry of Munitions.

FINANCIAL REPORTS AND MEETINGS.

United Electric Tramways of Caracas.—The accounts for the year ended June 30 show a disposable balance of £14,328, against £15,750. The directors recommend a dividend for the year of 7 per cent. (less tax) ; £2,428 forward. Last year the dividend was the same, but a bonus of 1½ per cent. was paid, with £1,300 forward. The percentage of operating expenses to gross receipts is 53·10, or 1·72 per cent. more than the previous year, due to the larger mileage run and higher cost of material and working.

Ayr Corporation Tramways.—The annual report prepared by the general manager, Mr. W. Grant, shows that the revenue totalled £19,285, an increase of £1,300. The number of passengers was 4,352,113, an increase of 332,342. The working expenses, including power costs, amounted to £11,828, or 6·20d. per car-mile. There has been increased expenditure resulting from allowances to dependants of employees on active service, war bonuses, and higher charges for electrical energy. The result of the year's working is a deficit of £16, which was paid out of the reserve fund. The reserve fund stands at £4,632, and depreciation and renewals fund at £14,571. The total number of employees who have joined the various branches of His Majesty's forces is 52, being 70 per cent. of the staff.

Double Income-tax and British Trade.—Speaking at the meeting of the Auckland Electric Tramways recently, the chairman alluded to the manifest inequity of the present system of double income-tax within the Empire. The matter had been receiving a good deal of attention lately, and an influential association is in existence with the object of using every possible endeavour to rectify the present unjust system. The Government have publicly admitted the grievance, and some measure of relief has been provided in the Imperial Finance Act of 1916, under which a proof of payment of colonial income-tax of not less than 1s. 6d. in the £, repayment can be claimed on the difference between the rate of 3s. 6d. in the £ imposed for the second half of 1915 and the rate of 5s. imposed for this year. The injustice is so glaring and the injurious effect on British trade so serious that the payment cannot be long continued.

East Ham Corporation Tramways.—The report of the East Ham Corporation Tramways (of which Mr. W. C. Ullmann is engineer and manager) for the year ended March 31, 1916, shows a marked

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improvement in the position. The total revenue amounted to £66,884, as compared with £60,232 for the previous year; the operating costs were £53,485, as compared with £51,619, while the gross profit was £13,399, compared with £8,613. After providing for repayment of interest and principal, there was a profit of £1,952, as compared with a deficit of £3,524 in the previous year. The total operating costs per car-mile amounted to 7·89d., the ratio of operating costs to revenue being 79·9 per cent., as compared with 85·7 per cent. The total revenue per car-mile was 9·87d., and the average energy consumption 1·50 units. No less than 51·39 per cent. of the passengers were carried for a halfpenny fare, the percentage of receipts from this source amounting to 32·35.

Cape Electric Railways Company.—At the annual meeting held in London on November 15, Mr. L. Breitmeyer, who presided, moved the adoption of the directors' report, which appeared in the issue of this journal of November 9. He stated that while the expenditure had increased in almost every item the traffic receipts showed an addition of £6,669 until March last, when the military forces left Cape Town for German East Africa. The increase in the receipts was exceeded by the extra cost of materials and labour, the latter being due to war allowances to employees and the payment of a bonus. There was an increase of £2,168 in colonial income-tax, while the London expenses had risen owing to the excess profits duty and the higher income-tax. Some of the additional sum paid on the latter account might be recoverable under the decision of the Treasury to grant relief to companies that were paying income-tax both in this country and in the colony. While the directors regretted that they could not maintain the former rate of dividend, they could not prudently reduce the amount to be carried forward, especially as the returns so far this year were below those of the corresponding period of last year. The report was adopted, and a dividend of 3¾ per cent. was declared on the ordinary shares, carrying forward £7,983.

Edison Swan Electric Company.—The net profits for the year ended June 30 total £24,146, and £4,879 was brought forward. It is proposed to transfer to the reserve £25,000, and carry forward £4,025. No dividend is recommended, in order that capital may be available for the extension of the business. Mr. C. J. Ford, who presided at the annual meeting on November 22, said that the turnover had been more extensive than since they started business. The profits increased from £56,000 to £65,000, while general expenses showed a reduction of £2,700. The net revenue increased from £14,000 to £24,000. The engineering side of the works had been almost wholly employed on Government work at moderately remunerative prices. They proposed to add £25,000 to the reserve, making that fund £40,000, and to carry forward £4,025. The board recommend the issue of £100,000 7 per cent. preference shares, having the right to participate in profits up to a further 3 per cent. after the ordinary shareholders had received a dividend, the rate of which had not yet been settled. Proprietors are to be offered a £1 preference share for every ordinary share now held. Debenture holders will be asked to allow the uncalled liability on the shares to be cancelled, and the two classes of debentures are to be consolidated into stock, bearing 5 per cent. interest. The report was adopted.

East India Tramways Company.—This company operates cars equipped on the "Simplex" petrol system, and its results are for that reason of special interest. The results of working for the year, compared with those of the previous year, are as follows:—

	1915–16.	1914–15.	Inc. or Dec.
Gross receipts	£27,104	£25,307 +	£1,797
Working expenses	£19,408	£16,832 +	£2,576
Net receipts	£7,696	£8,475 −	£779
Reserve account	£400	£1,346 −	£946
	£7,296	£7,129 +	£167
Brought forward	£104	£21 +	£83
Balance available for dividend	£7,400	£7,150 +	£250

This balance the directors recommend should be appropriated as follows:—5 per cent. dividend on the cumulative preference and ordinary shares, of which an interim dividend of 2½ per cent. was paid May 31, 1916, £2,045; 10 per cent. on the deferred shares (on which an interim dividend of 2½ per cent. was paid May 31, 1916), £5,000; total, £7,045, leaving a balance to be carried forward of £355. The directors record with great regret the death in August last of Mr. John Abbott, who had been chairman of the company since its commencement, and to whose engineering ability and experience the company is largely indebted for its present successful position. His son, Mr. John Dixon Abbott, who was for three years the company's engineer resident in Karachi, has been appointed to fill the vacancy on the board. Since his return to England Mr. Abbott has acted as consulting engineer in this country.

Provincial Tramways Company, Limited.—The annual report of this company, of which Mr. J. Barber Glenn is the managing director, recommended that from the balance of £27,376 remaining on the year's trading a dividend be paid on the £1 ordinary shares of 10d. per share, and a bonus of 6d., equal to 1s. 4d. per share. With 8d. per share paid in June last, these shares receive a dividend of 2s., equal to 10 per cent. for the year. Mr. Andrew Beattie, D.L. (chairman), in moving the adoption of the report at the annual meeting on November 24, stated that for many years the company had had a long run of prosperity, and the prosperity of the past two years was owing somewhat to the war. The past year had been the best in their history. In 1913 the net profit was £41,085, in 1914 £40,297, in 1915 £48,789, and this year £52,289. In the North of England business had been interfered with owing to the raids. The receipts generally showed an increase of £7,416. The working expenses had increased considerably, and insurance against raids meant a sum of £732. Some towns had been darkened to such an extent that during the winter services would have to be curtailed. Crude oil used for the Diesel engines now costs £7 7s. per ton, as against £3 16s. on the previous contract. £10,071 had been carried forward, as against £11,000. Mr. Samuel Hern (Cardiff), in seconding, said that a large sum would be required out of the reserve fund for the work of track reconstruction, which, owing to the war, was long overdue. Mr. Beattie was re-elected a director, and, on the proposition of Mr. J. Barber Glenn, seconded by Mr. H. H. Peters, the sum of £600 was voted to the directors as extra remuneration for the past year. The thanks of the meeting were accorded to the managers, staff, and employees of the local companies for their services.

CONTRACTS AND ORDERS.

Hadfields, Limited, have an order to supply special track work to Newcastle Tramways Committee.

Crompton and Company, Limited, are supplying a motor and starting panel to Ilford Electricity Committee.

Messrs. Cammell, Laird and Company, Sheffield, are supplying 200 tires to Hull Corporation Tramways at £41 10s. per ton.

The General Electric Company, Limited, have a contract to supply switchgear for a sub-station of the Bacup electricity works.

Shanghai Council have placed a contract with the General Electric Company of China for Osram lamps for street lighting for twelve months.

Sheffield Tramways Committee have placed a contract with Messrs. Meade-King, Robinson and Company for the supply of motor spirit for the omnibus department.

Sheffield Tramways Committee have accepted the tender of Dawson and Jones, Limited, for alterations and additions at the Townend tramway depot, at £3,619, in order to fit it for an omnibus garage.

Johannesburg Council have placed the following contracts:—10,000 lb. copper wire, and 10 miles of underwriters' wire, Telegraph Manufacturing Company, Limited, Helsby; 10,000 Edison metal filament traction lamps, Griffin Engineering Company, Bath; six 150 K.V.A. transformers, Sykes and Company.

Melbourne Car Lighting.—The Tramways Board offer a premium of £100 for the most suitable design for the lighting of 1,250 cars with lights of approximately 100 candle power each. Tenders recently sent in did not prove satisfactory, the fault in most cases being the expense of working, according to the "Australian Mining Standard."

Walthamstow Council have placed the following contracts:—Babcock and Wilcox, water-tube boiler, economiser, steel chimney, pipe work, hotwell tank, feed pump, and induced draught tank; Bruce, Peebles and Company, 1,000 KW. motor converter; British Thomson-Houston Company, and General Electric Company, L.T. switchgear.

Manchester Corporation have allotted contracts as subjoined:—Cable—British Insulated and Helsby Cables, Limited; Western Electric Company, Limited; Callender's Cable and Construction Company, Limited. Turbine feed pump—G. and J. Weir, Limited, Glasgow. Sub-station switchgear,—Ferranti, Limited, Hollinwood. Copper trolley wire—F. Smith and Company, Limited, Salford.

Sheffield Electricity Committee have placed the following contracts:—Two turbo-alternators, switchgear, and alterations to pipe work at Neepsend and Sheaf Street generating stations—C. A. Parsons and Company, Limited, £19,000, plus 5 per cent. for contingencies; 20 panels of H.T. two-phase sub-station switchboards—A. Reyrolle and Company, Limited, Hebburn-on-Tyne, £2,709; 10,000 3-in. cast-iron cable pipes—Staveley Coal and Iron Company, Staveley, at £7 10s. per ton.

Glasgow Tramways Committee have allotted six months' contracts as subjoined:—Car-wheel tires, Brown, Bayley's Steel Works, Limited; malleable castings, Alex. Shanks and Son, Limited; iron and steel bars, P. and W. MacLellan, Limited; springs, L. Sterne and Company, Limited; oils, J. Murray and Son, Limited, Messrs. Marks and Johnston, J. and D. Hamilton, Limited. Three months' contracts have been arranged with Miller and Company, Limited for the supply of chilled brake blocks, and with Pilkington Brothers for glass. A six months' tender for glass by Chance Brothers, Limited, has also been accepted.

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NEW AND PROSPECTIVE WORK.

The Tramways and Motors Committee of Sheffield Corporation have agreed to erect a new depot at the corner of Pickmere and Fitzgerald Roads.

The Halifax (Nova Scotia) Tramway Company intend to reconstruct their lines and to replace a large part of the equipment at a cost of about £300,000.

The Leicester County Council have decided to invite tenders from selected firms for the purchase of about 3,000 yards of trolley wire required for renewal purposes.

The Southampton Electricity Committee have authorised the electrical engineer to prepare a scheme for increasing the boiler installation at the electric generating station.

A report has been presented to the Dundee Corporation Tramways Committee stating that seven miles of single track will need renewal after the war, and that a portion of the work is urgent.

Plans have been submitted to Morecambe Council for the erection of a new tramway office and a shelter for passengers near the central pier. Lytham Urban Council are considering plans for a tramway shelter at Ansdell.

The chairman of the Works Committee of the Brighton Corporation and the borough surveyor have been authorised to make inspection of motor vehicles in use in other towns for street cleaning and refuse removal.

The electric lorry and an electric passenger car which Wolverhampton Corporation have agreed to purchase for the tramways department will be used for speedy conveyance to breakdowns, repairs and testing, also for supervision by the management.

The arrangement made by the Tramways and Light Railways Association with the manufacturers of steel tires in November, 1915, is to be continued for the quarter ending January 1, 1917, so that prices will remain the same as hitherto. A permit from the Ministry of Munitions (Priority Branch B.M. 3) is now required with each order.

Six new double-deck tramcars are being obtained for the Rotherham Corporation Tramways. The need for more cars is shown by the increase in the number of passengers. For the half-year ended September 30 they totalled 7,839,083, as compared with 4,159,824, for the corresponding period of 1912, while the receipts have risen from £19,299 to £34,343.

With a view to prevent a recurrence of the recent accident on the curve at Clifton Place, Newport, Mr. Nichols Moore, borough electrical and permanent way engineer, has obtained the sanction of the Board of Trade to doubling the track and interlacing the track between Charles Street and the curve. The latter improvement would do away with the facing points. The Tramways Committee have decided to defer for the present the carrying out of this portion of the alterations.

The Board of Trade have extended for one year from September 6 the time limited by the Birmingham Corporation Light Railways Order, 1912, for the completion of works, and by the Birmingham Corporation (Quinton) Light Railway Order, 1913, for compulsory purchase of lands and completion of works. Manchester Corporation are applying for an extension of time for the construction of the authorised tramways in the districts of Barton-upon-Irwell, Northenden, Sale, Stretford, and Urmston, and in the city.

In response to the inquiry of a Government department as to work that will require to be executed after the war the borough engineer of West Hartlepool has included in his report the relaying of the Foggy Furze section and the proposed line at the south side of the municipal buildings. Dewsbury Corporation have included tramway extensions of an estimated cost of £2,015 in the programme of work required to be executed after the war. Leeds Tramway department has intimated that at least £150,000 must be spent on tramway repairs after the war.

The value of the stores in the tramway department of the London County Council at March 31, 1916, amounted to £198,611, representing an increase of £48,611 over the amount (£150,000) voted under standing order No. 217. The Highways Committee reported that the excess was due to a variety of causes, but mainly to the increased prices of materials, particularly metals and timber, and to other conditions arising out of the war. In view of the extent (147 route miles) of the Council's tramways and of the necessity for providing parts and equipment for two systems of electric traction, the committee do not anticipate that any reduction can be made at present in the value of the stock of stores, and they recommend that the amount to be voted under the standing order should be increased to £220,000, which was agreed to.

L. & S.W. Suburban Electrification.—The electrification of the Claygate section of the London and South Western Railway Company's suburban lines has been completed, and a half-hourly service of electric trains between Claygate and Waterloo, covering the journey in 29 minutes, will begin next Monday. Rail motors will run every half-hour in connection with the electric service between Claygate and Guildford. The electric service from Waterloo to Hampton Court will now comprise four trains an hour.

PERSONAL.

Mr. John Christopher Mitchell, who has recently been elected president of the Chartered Institute of Secretaries, is a native of Birmingham and was educated at St. Albans Grammar School. Practically all his business life has been spent in the passenger transport trade of London; he was appointed to the staff of the London Road Car Company, Limited, in 1886, by the late Archibald Grierson, C.A. (Glasgow), then secretary of the company, with whom he was associated for nearly 20 years. In less than three years was appointed accountant to the Road Car Company, succeeding to the secretaryship in 1905 on the death of Mr. Grierson. In 1908, on the amalgamation of the omnibus undertakings in London, he was appointed secretary of the London General Omnibus Company, Limited, and in 1912, upon the consummation of the scheme for the combination of the interests of the London General with those of the Underground Electric Railways Company of

Mr. J. C. Mitchell
(Treasurer of the London Underground and Allied Companies).

London, Limited, he was made comptroller of the latter company. Shortly afterwards he was appointed treasurer of the Underground Company and of all the allied companies, including the Metropolitan District Railway, the London Electric Railway, the Central London Railway, the City and South London Railway, the London General Omnibus Company, and others. Mr. Mitchell is an active freemason and has taken a keen interest in Church matters, and has been a member of the National Council of Church Bellringers. He is a freeman of the City of London, being on the livery of the Worshipful Company of Coachmakers and Coach Harness Makers. He resides in Norwood and has been a member of the Lambeth Borough Council since 1912.

Mr. H. J. Hawkins, formerly electrical engineer to Salford Corporation, has been appointed chief engineer to a London firm at Karachi.

Sir William Clegg has again been re-elected chairman of Sheffield Tramways Committee, an office which he has held for many years. The vice-chairman is Alderman Fenton.

Mr. Robert Owen, deputy electrical engineer to Leeds Corporation, has been appointed borough electrical engineer at Wigan. One hundred and six applications were received.

Mr. F. Golding, assistant electrical engineer to the Commonwealth Postmaster-General, has been appointed electrical engineer for Victoria, in succession to Mr. A. A. Dircks, who has become electrical engineer of New South Wales.

Mr. W. Hopkins, chief assistant to the general manager, West Ham Corporation Tramways, has been granted an honorarium in consideration of the extra responsibility placed upon him during the recent change of management.

Mr. E. V. Hiley, town clerk of Birmingham, has tendered his resignation, having accepted a seat on the board of directors of the Metropolitan Carriage, Wagon, and Finance Company, Limited, of which Mr. Dudley Docker, C.B., is chairman.

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Mr. W. H. Allen, who in August resigned the appointment of engineer and manager of Loughborough Corporation Electricity Department, joined Messrs. Chance and Hunt, Limited, at Oldbury, in an advisory capacity for the whole of their works at Oldbury and in various other parts of the country, and also the Government sites "A," "B," "C," and "D."

Mr. Peter Fisher, general manager, Dundee Corporation Tramways, at a meeting of the tramways committee on November 20, observed that at the Council meeting a member had asked whether he attended the meetings of the Municipal Tramways Association at the Council's expense. Mr. Fisher said he attended the conferences at great inconvenience, for he detested travelling, but he went because he considered he was doing most valuable and most important work as part of his duty. Mr. G. A. Johnston, chairman of the committee, said that from experience he knew that what Mr. Fisher had said was correct. As Mr. Fisher, as ex-president, is a member of the Executive for another three years, the committee unanimously agreed that he should attend their meetings.

Councillor Max Muspratt, the new Lord Mayor of Liverpool, is a member of the Tramways and Electricity Committee, and Councillor Harrison Jones, in proposing his election, remarked that his special knowledge had been of great service to that committee. Sir Charles Petrie, a former chairman of the committee, seconded the motion, which was supported by Alderman Harford, leader of the Irish party, who referred to Mr. Muspratt as a great chemist. His Lordship presided at the first meeting of the Tramways Committee for the new year, when Councillor Russell Taylor was re-elected chairman. Owing to his elevation to the position of chief magistrate, Councillor Muspratt has resigned his membership of the committee, but the members decided to keep the vacancy open for him to return in November next.

Mr. J. A. Barkley, general manager at Cape Town for the Cape Electric Tramways Company, resigned his position in November, 1915, owing to ill-health. **Mr. W. F. Long,** formerly municipal electric engineer of Cape Town, was appointed manager, and he began his duties at the beginning of February last. Shortly after his appointment labour troubles arose, which culminated in April with a strike on the part of a number of motormen and conductors. This continued for about four weeks, but during the whole of the time, with few exceptions, the system was kept running full time. Eventually many of the employees returned to work on the terms offered by the company. The directors remark, in their annual report, that there is every reason to hope that the company's relations with the employees are now established on a satisfactory basis, and they attribute the result to the energetic action and tact displayed by Mr. Long and the local directorate.

Mr. J. McMahon, general manager, Colombo Electric Tramways, died suddenly on September 14. At the funeral the hearse was drawn by employees of the tramways, and the inspectors carried the coffin to the grave. Mr. McMahon went to Ceylon in 1898 in connection with the construction of the Colombo Tramways, which were opened in January, 1899. Since then he had been in the service of the company, rising from the position of chief inspector to that of general manager. He was held in high esteem by the company and was beloved by his subordinates.

WITH THE FORCES.

Mr. P. A. M. Nash has been appointed a Deputy Director-General of Transportation at the War Office.

Mr. J. S. Pitkeathley, C.V.O., electrical engineer, Imperial Works, Delhi, has been gazetted as temporary major.

Lance-Corporal R. Munn, Scottish Rifles, a former employee on Glasgow Corporation Tramways, has gained the Military Medal.

Second Lieutenant C. P. Everson, son of the general manager of Plymouth Corporation Tramways, has been reported missing since he was wounded on October 2.

Lance-Corporal A. Smith, York and Lancaster Regiment, who has been awarded the Military Medal, before enlisting was a conductor on the Glasgow Corporation Tramways.

Mr. W. A. Cocking, engineer of the British Automobile Traction Company, Limited, has received a commission in the Royal Engineers, and has left London to undertake important work abroad.

Sergeant A. E. Irving, a Burnley Corporation tramway employee, who has been wounded, has won the D.C.M., and was also awarded the decoration of the third class of the Order of St. George of Russia.

Captain A. R. Smith, who has been awarded the Military Cross, was on the commercial staff of Edison Accumulators, Limited, at the outbreak of the war, and had previously held a commission in the old Volunteer Force.

Second Lieutenant A. R. Fyfe, R.E., son of Mr. Fyfe, works superintendent of Aberdeen Corporation Tramways, has sustained a gunshot wound on the right knee. Mr. Fyfe joined up from the engineering staff of the borough surveyor.

Staff-Sergeant F. Bryant, a motorman of the Torquay Tramways Company, who enlisted two years ago and is now in France, has in that period been promoted from private to his present rank. He is 25 years of age, and is serving in a Devonshire battalion.

Ex-Conductor W. J. Booth, of Wigan Corporation Tramways, who has been serving for some time in the army, has been recommended for commissioned rank. The distinction has been conferred, and 2nd Lieutenant Booth has received the congratulations of the tramways committee.

Corporal W. Scott, R.A.M.C., formerly a motorman on the Glasgow Corporation Tramways, has been decorated by the King of Serbia with the Serbian Silver Military Medal for conspicuous gallantry and services at the transport of the Serbian Army in the Dardanelles after the retreat from Serbia.

Sergeant T. Morgan, South Wales Borderers, a former conductor with Swansea Tramways Company, has gained the Military Medal for bravery in action. He has been in France for nearly two years, and on returning on a short period of leave he was presented with a gift by the Llandovery Reception Committee.

Regimental-Sergeant-Major J. R. Jones, London Battalion, Royal Welsh Fusiliers, has won the Military Cross for gallantry under shell fire on several occasions. He was formerly a motorman at West Ham, and his former comrades have presented him with a silver tea service. Mr. L. Slattery, the general manager, made the presentation.

Mr. H. P. Maybury, engineer and manager to the Road Board, recently visited France with Sir Eric Geddes, the Inspector-General of Transportation, and on Nov. 17 he was gazetted as a Deputy Director-General of Transportation and Principal Road Engineer, with the rank of temporary brigadier-general. The appointment is to date from October 20, and it is graded for purposes of pay as an assistant director of supplies and transport.

Lieutenant F. A. Robinson, late of the electrical department of the India-rubber and Telegraph Works Company, Limited, Silvertown, has gained the Military Cross for gallantry on two occasions while in charge of a "Tank." One machine was impeded by obstacles, and the officer and men were digging for fourteen hours under fire before they liberated it and returned. A shell disabled the other vehicle, but the crew entered a trench, where the lieutenant worked a machine gun.

Wounded Portsmouth Men.—An enthusiastic welcome was given to Sergeant J. Coates, R.E., Corporal Slater, and Privates A. Pack and E. Bartlett, at a meeting of the St. Mark's Tramway Brotherhood at St. Mark's Institute, Portsmouth, on November 12. The four ex-tramwaymen have been wounded in the war, the corporal having lost his right arm and been discharged. On behalf of the members, Corporal A. W. Saunders (inspector) expressed sympathy with the corporal, and wished him success in his return to civil life.

Sergeant T. Jones, 2nd Welsh Regiment, for many years a Cardiff Corporation Tramway employee, has gained the Military Medal and a bar for gallant conduct in continuing an assault and also for bringing in the wounded. The decorations were presented to him by the Lord Mayor at a meeting of the City Council, and on November 17 the gallant sergeant's former fellow employees entertained him at a smoking concert. Mr. A. Ellis, the general manager, presided, and on behalf of the employees presented Sergeant Jones with a silver epergne.

Honours for London County Council Tramway Employees.—At a recent meeting of the London County Council the chairman announced that the Military Medal had been awarded for bravery in the field to three tramway employees:—Rifleman J. A. Collier (clerical assistant, Finsbury office), London Regiment; Lance-Corporal G. Brickwood (ganger), Royal Engineers; and Private I. W. W. Powlesland (conductor, Holloway Depot), Grenadier Guards. He had conveyed the congratulations of the Council. Corporal J. Thompson (permanent way driller), East Kent Regiment, was awarded the Military Medal for gallant conduct and devotion to duty in the field in July; he regretted to say Corporal Thompson was killed in action on September 30 last. He had sent a letter to the relatives. At the same meeting the deaths of seventeen employees on active service were reported.

Sergeant S. Baron, King's Royal Rifles, killed in action, was an inspector on Darwen Corporation Tramways.

2nd Lieutenant T. F. Whimster, R.E., killed in action, was the head of the testing department in the Victoria Falls Electric Station, Germistown, near Johannesburg, before enlisting a year ago.

Corporal A. J. Pritchard, who was awarded the Military Medal for conspicuous bravery at Vimy Ridge, has been killed in action. He was formerly on the staff of Plymouth Corporation Electricity Committee.

Lieutenant T. Higgins, R.E., who died in France from wounds on November 15, received the Military Cross in September last. He was formerly an engineering assistant to the borough surveyor and tramway engineer of Leicester, and in October, 1914, he joined the engineering section of the Royal Naval Division. In April last he was given a commission in the Royal Engineers.

Corporal C. F. Bell, Royal Warwickshire Regiment, who was killed in action, joined the army in September, 1914, from the Birmingham Corporation Tramways. For many years he was with the Bristol Tramways and Carriage Company. In announcing his death to his parents at Bristol, his captain stated that he felt his loss enormously, and that the deceased was a favourite both with officers and men.

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TRAMWAY CHAIRMEN FOR 1916-17.

Municipal Tramways Committees have now been constituted for the ensuing year, and we append a list of the chairmen and the vice-chairmen. An asterisk indicates that a new chairman or vice-chairman has been appointed.

Town.	Chairman.	Vice-chairman.
Aberdare	Coun. E. Stonelake	
Aberdeen	Coun. Robertson	
Accrington	Ald. Higham	Coun. Morley.
Ayr	Coun. J. R. Learmont	
Bacup	Ald. Sir H. Maden (Mayor)	Coun. J. H. Lord.
Barking	Coun. D. Gordon	
Batley	*Coun. F. W. H. Auty	*Coun. J. E. Oldroyd.
Belfast	Coun. J. McCaughey	Coun. J. Warwick.
Bexley	*Coun. G. Sheldon	
Birkenhead	Coun. H. Halsall	Coun. R. Frame.
Birmingham	Coun. H. Barrow	*Coun. Fryer.
Blackburn	Ald. W. Thompson	Coun. C. Higham.
Blackpool	Ald. Brodie	Coun. Holt (Deputy Mayor).
Bolton	Ald. J. Miles	Coun. P. Higson.
Bradford	Coun. E. Priestley	*Coun. I. F. Akeroyd.
Brighton	Coun. A. Martin	
Burnley	Coun. E. Heap	Coun. Irving
Burton-on-Trent	Ald. Rowland (Deputy Mayor)	*Ald. Medcalfe.
Bury	Ald. Collinge	Coun. Hargreaves.
Cardiff	Ald. Sir J. W. Courtis (Deputy Mayor)	Coun. A. J. A. Stone.
Chesterfield	Ald. E. Shentall	Coun. Woodhead.
Coventry	Coun. Pugh	Coun. Wale.
Croydon	Ald. Allen	Coun. Thomson.
Darlington	Ald. C. W. Starmer	
Dartford	Coun. R. Bennett	*Coun. W. H. D. King.
Derby	Coun. Dean	
Doncaster	*Coun. S. Balmforth	*Coun. H. M. Marshall.
Dover	Coun. Barwick	Coun. Norman.
Dundee	Coun. Johnston	
East Ham	Ald. M. Oakes	
Eccles	*Coun. Alexander	*Ald. Pearson.
Erith	Coun. G. C. Humphreys	
Farnworth	Coun. Steele	
Glasgow	Coun. M. W. Montgomery	Bailie T. Kelly.
Gloucester	Coun. J. O. Roberts	Coun. C. J. Ramstedt.
Halifax	Ald. C. F. Spencer	Ald. A. Fawcett.
Haslingden	Coun. Waddington	Coun. Haworth.
Heywood	Coun. I. Ashworth	Ald. Popple.
Huddersfield	Coun. E. H. Sellers	Coun. T. Canby.
Hull	Coun. W. Wheatley	Coun. W. Hakes.
Ilford	*Coun. O. Waters	*Coun. J. Lowe.
Keighley	Coun. A. Smith	
Kilmarnock	*Coun. Lorimer	
Lancaster	Coun. Wilkinson	
Leeds	Ald. R. A. Smithson	Ald. H. Brown.
Leicester	Ald. Flint	Ald. Banton
Leith	Judge Hall	
Leyton	Coun. F. M. Read	
Lincoln	Ald. W. S. White	
Liverpool	Coun. E. Russell-Taylor	Ald. F. Smith.
Lowestoft	Coun. Spashett (Mayor)	
Maidstone	Coun. Lyle	Coun. Green.
Manchester	Ald. J. Bowes	Ald. A. W. Chapman.
Middlesex C.C.	Ald. H. Burt	
Nelson	Coun. Cooke	
Newcastle on-Tyne	Coun. R. Mayne	Coun. A. M. Sutherland.
Newport	Coun. J. Moxon	Ald. F. Phillips.
Northampton	Coun. T. D. Lewis	Coun. W. Beale.
Nottingham	Coun. R. H. Swain	Ald. Radford.
Oldham	*Coun. Cheetham	*Coun. Stanbury.
Perth	Coun. Calderwood	
Plymouth	Ald. S. H. Phillips	Coun. J. Moon.
Pontypridd	Coun. M. L. Jones	
Portsmouth	Coun. J. Timpson	Ald. R. Payne.
Preston	Ald. J. Ormrod	Coun. T. Parkinson.
Rawtenstall	Ald. H. Coupe	Coun. J. W. Stansfield.
Reading	Ald. Field	
Rochdale	Ald. Taylor	
Rotherham	Ald. Winter	Coun. Reeves.
Salford	Ald. H. Lansley	Coun. W. H. Barrett.
Sheffield	Ald. Sir W. Clegg	*Ald. W. C. Fenton.
Shipley	Coun. H. Pitts	
Southampton	Ald. Dunsford	
Southend	*Coun. G. Radford	
Southport	Ald. Griffiths	Coun. Clayton.
Wallasey	Coun. F. E. Howse	Coun. Griffin.
Walsall	Ald. Cope	Ald. Williams.
Walthamstow	Coun. W. R. Clarke	
Warrington	Coun. Dr. Joseph	Coun. Wilkinson.
West Bromwich	Ald. Turley	Coun. Garrett.
West Ham	Coun. Kensett	
West Hartlepool	Ald. Martin	Coun. Charlton.
Wigan	Ald. R. T. Fletcher	Coun. J. Walkden.
Wolverhampton	Ald. Sir C. T. Mander	
York	Ald. Meyer	Coun. Sessions.

TRAMWAY AND LIGHT RAILWAY NOTES.

BIRMINGHAM.

INADEQUATE SUPPLY OF ENERGY—SINGLE-DECK CARS AND TRAILERS' RESTRICTED LIGHTING.

The suspension of tramway traffic at Birmingham during the slack hours owing to the difficulties of the Electric Supply Department at the generating station is entailing great loss of traffic. Until the shortcomings are remedied the cars continue to be stopped at the less busy periods of the morning and afternoon, and there are also occasional stoppages at other periods. The Supply Department have not yet received any communication from the Ministry of Munitions in reply to their proposal to divert sufficient energy to the Tramway Department to enable it to run a modified service throughout the day. The present situation, in which the service is interrupted daily sometimes for several hours, is becoming intolerable. The Tramway Department is entirely dependent on the Electric Supply Department, and is powerless to improve matters. Following the recent experiment with a double-deck motor car and a single-deck trailer, Mr. Alfred Baker, the general manager at Birmingham, is now operating on the Washwood Road route two single-deck units. The new method is held to be more suitable for the 3 ft. 6 in. gauge, and it is reported to have been so successful that it will probably be extended to several busy routes. Expeditious loading and unloading is achieved owing to the absence of a top deck to the motor car. The general manager of the Birmingham Corporation Tramways has drawn the attention of the chief constable to the anomaly of the poor light allowed on the tramcars and that on motor cars and cycles. It is hoped to make an arrangement to allow a diffused light to be thrown on to the road from the headlights on the cars.

BRADFORD.

WOMEN CONDUCTORS AND THE SAND PEDAL—ADVANTAGE OF TICKET BOXES.

The Bradford Coroner held an inquiry on November 21 into the death of a woman who was injured in jumping off a tramcar while it was running back about 150 yards. The motorman had stopped to pick up a passenger in a loop, and on reaching the single line he saw a car coming. He therefore backed into the loop. After going about two car lengths the wheels began to slip, and he applied the hand brake, afterwards using the electric brake. He then called to the conductor for sand, and when he found the sand was not falling he went to the other platform and worked the pedal himself. As soon as the sand began to fall the car stopped. The woman conductor of the car stated that she called to the passengers to keep their seats, and at once put her foot on the lever, which she thought was working. The deceased followed the driver to the platform and jumped off. In reply to questions, the conductor said she was only shown once on the learners' car how to apply sand, but she knew what to do when the driver called for sand. The jury returned a verdict of accidental death. Mr. E. Priestley, chairman of the tramways committee, and Mr. C. J. Spencer, general manager, attended the inquest. As the result of placing used ticket boxes on the Bradford tramcars, the department recovers about 12 tons of tickets annually, and disposes of them at the rate of £2 per ton. The Corporation are now obtaining £9 per ton for old papers, account books, etc., which they formerly had to pay 30s. a ton to have taken away. The recovery of marketable constituents from the city's sewage is producing over £60,000 a year.

BLACKPOOL.

CONTRACT TICKETS.

In his annual report on the tramways undertaking, the general manager expresses regret that after consideration of lengthy reports and recommendations on the subject of annual contract tickets, no definite decision to revise the conditions was arrived at, the matter being deferred until after the war. In 1911 the number issued was 922, and the revenue £2,516. In 1915-16 the figures were 1,482 and £4,241.

CARDIFF.

CONDITION OF WOOD PAVING.

In view of the urgent need for repairs to the chief streets of Cardiff Sir John Courtis, chairman of the tramways committee, on November 2 asked for a declaration of the policy of the Public Works Committee. Alderman W. Roberts replied that to relay the roads

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with timber at its present prices would be folly. Where they were able to do repairs without treating long lengths of road they were doing them. Alderman Sir John Courtis opposed the policy of waiting till the war was over. Although the price of timber was high, it was likely to remain high for some time after the war. Unless something was done they would soon have to start digging people and cars out of the roads.

CHESTERFIELD.

CARS DAMAGED BY FIRE AT DEPOT.

As the result of a fire in the Chatsworth Road depot during the early morning of October 20, a double-deck car body was destroyed and six other cars were more or less damaged. The outbreak originated in the paint shop, which was burnt out, while a considerable portion of the remainder of the depot was damaged. Owing to the severance of the cables by the flames the cars had to be moved by men pushing them. The firemen prevented the flames attacking the adjoining motor omnibus depot. A claim for £3,000, the estimated amount of the damage caused by the fire, has been made on the insurance company by Chesterfield Tramways Committee. Two new car bodies and sets of electrical equipment have been ordered.

DONCASTER.

BY-LAW CONCERNING FARES

The Board of Trade have provisionally approved the Doncaster Corporation's new tramway by-law as follows:—"Each passenger shall, either on demand or before leaving the car (whichever first happens), pay to the conductor or other duly authorised officer of the Corporation the fare legally obtainable for his journey, and shall accept a ticket therefor. Any person leaving a car shall be deemed to have completed his journey."

DOVER.

HIGHER CHARGE FOR ENERGY.

From April 1 next Dover Electricity Committee will increase the charge for energy supplied to the tramways by 20 per cent., in order to help to meet an anticipated deficit, more than half of which is due to additional interest on loans.

DUBLIN.

NEW SERVICE INSTITUTED.

On November 20 the Dublin United Tramways Company instituted a new service, the termini of which are Westland Row and Fairview. By the innovation the emergency line between O'Connell Street and Talbot Street *via* Upper Abbey Street and Gardiner Street is for the first time being generally utilised.

DUDLEY.

FINED FOR GIVING A STARTING SIGNAL.

A passenger, 16 years of age, was summoned at Dudley for signalling a car at the terminus and was fined 40s., the presiding magistrate remarking that a serious accident might have happened. It appeared that the inspector on duty whistled for the car to start, whereupon the woman conductor rang the bell. Receiving an answering signal she released the back brake. At the time the motorman had taken a parcel to the parcels office, and when returning he heard the several signals. The car started, and he ran round to the front and got in, where he saw defendant holding the bell cord. The motorman brought the car to a standstill near the station. Mr. J. A. Shepherd, who appeared for the South Staffordshire Tramways Company, stated that an accident had happened under similar circumstances, resulting in loss of life and costing the company a sum exceeding four figures.

EDINBURGH.

CABLE CAR ACCIDENTS.

The remarkable immunity from accidents involving personal injuries that characterises the Edinburgh cable tramways was broken three times on November 9 and 11. On the first-mentioned date a car, proceeding eastwards along London Road, had reached the point where the cable is released and the vehicle makes its return journey from the end of Norton Place. Passengers had risen to leave the car, when suddenly it gathered speed and dashed along the rails leading on to the Portobello route. Here it ran into a Joppa car, which was stationary, with the result that occupants of both vehicles suffered badly. Sixteen persons received attention from doctors, two being taken to the infirmary. Two mishaps occurred on the second date. In one case a car, driven by a learner (accompanied by an inspector) struck the metal pawl under the cable slot at the east end of Princes Street, owing to the gripper not having been raised beyond the reach of the block. Six persons sustained cuts, shocks, or a shaking. The other accident was a collision between two cars at Pilrig terminus, when three persons were slightly injured.

HUDDERSFIELD.

VOLUNTEER MOTORMEN.

Mr. R. H. Wilkinson, general manager of the Corporation tramways, has obtained the sanction of the committee to train a number of men above military age to act as motormen early in the morning and evening. The men will be paid for their services. This step has become necessary owing to the number of motormen having been called up for military service.

HULL.

WOMEN DRIVERS—REVISION OF FARES—SOLDIERS TO PAY.

The Tramways Committee have authorised the management to introduce women drivers where advisable. It is estimated that for the year 1916-17 Hull tramways undertaking will show a deficit of £2,447. The chairman (Councillor W. Wheatley) has stated that the stages will have to be revised, and the penny fare for through rides from extreme points increased. While free rides will still be allowed to the wounded, other soldiers will be charged halfpenny fares. In order to effect economy and to relieve the strain on the staff, the services are to be curtailed by periods ranging from 15 to 40 minutes on weeknights and 58 minutes on Sundays.

ILFORD.

CAR TRAFFIC DURING RAIDS.

Ilford Council at their last meeting received a letter from the Commissioner of Police stating that any proposal to stop tramway traffic is not approved by the Field Marshal, and further that the competent military authority may feel it necessary to issue a specific order under the powers conferred by the Defence of the Realm Regulations. Subsequently the Council adopted a report by the Tramways Committee recommending that the service be continued at a reduced speed when warning is given of a raid, and in accordance with the regulations approved by the military authorities, who attach great importance to the point that the service should not be stopped. On the London County Council Tramways the warning will be given by means of a green light on the feeder pillars.

IPSWICH.

OPPORTUNITY TO ABANDON UNPROFITABLE SECTIONS.

The difficulty of obtaining rails and the need for repairing tracks give rise to the suggestion that there could not be a more favourable opportunity for doing away with any route that has proved hopelessly unprofitable and is not essential for the public convenience. In connection with the need for track renewals at Ipswich, Mr. F. Ayton, the general manager, has recommended that when the time arrives for relaying the Norwich Road line the question of abandoning the distant section running into Whitton should be considered, this having always proved a dead loss. Mr. Ayton makes a similar reference to Burrell Road and Bath Street, and he suggests that the rails of the three sections referred to should be taken up and used for repairs elsewhere.

LANARKSHIRE.

WAGES ARBITRATION.

The Board of Trade have appointed Sheriff Mackenzie, K.C., as arbiter in the disagreement between the Lanarkshire Tramways Company and their employees. The matter for arbitration is a question of an advance of 6d. per day claimed by the conductors, and the levelling up of the recent advance to drivers of 9d. per day all round. In September last the drivers were granted an advance ranging from 5d. to 9d. per day.

LLANDUDNO.

SUNDAY RUNNING AND THE CHARGE FOR ENERGY.

A sub-committee has been appointed by Llandudno Urban Council to consider an offer made by the Llandudno and Colwyn Bay Railway Company to pay a higher price for energy if the authority will waive their objection to Sunday traffic and rescind the by-law with reference thereto. The company have pointed out that it is only by the reciprocal measures suggested that the Council can escape a burden which is at present onerous, and may continue for some considerable time, as in the opinion of experts it is improbable that coal prices can return to normal for some years. The company's offer is made in reply to the Council's request that the agreement concerning the supply of energy should be varied, as under present conditions the Council is losing heavily. Unless they are given the opportunity of earning additional revenue the company state that they cannot respond to the request.

LONDON.

TRAFFIC IMPEDED BY FOG.

From an early hour on Monday evening, November 13, until past midnight the Metropolitan area was enshrouded in a fog more dense than has been experienced for a number of years. Railway and omnibus traffic was delayed, and in open spaces omnibuses and cabs had to be guided by policemen with lamps, or else by conductors of the former, for as soon as the vehicles were out of sight of the kerb the drivers lost their course. On tramway routes the rails, under the reflection of the headlights of motor vehicles, proved a guide to the latter, while tramcars accomplished their journeys with a little delay. For instance, a run that under normal conditions takes forty minutes required an extra twenty minutes. To achieve this result the motormen had to bring into use the banned headlight, throwing open the glass flap and in some cases freeing the lamp glass of the discolouring matter. On the Embankment motor cabs made their way only by running on the tramway route. Underground railways had a great accession of traffic. The crossing of the bridges was a difficult task for omnibuses, which were provided with an extra man on the front seat with an electric torch. In North London the omnibuses had to stop, and long lines of them were drawn up. Bristol also experienced a fog, which caused some of the omnibus services to be suspended.

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LOWESTOFT.

EFFECT OF WAR ON TRAMWAY TRAFFIC.

An inquiry has been held at Lowestoft into an application by the Corporation for the issue of a Provisional Order to amend the Corporation Act so as to empower the Corporation to borrow temporarily for current expenses, and to empower them to borrow for the purposes of money previously borrowed by them, etc. The town clerk stated that the war had caused a complete loss of the visiting seasons, and almost a complete loss of fishing seasons, and, owing to the calling in of mortgages, and the increased rates of interest, the Corporation had had to call upon their bankers for considerable advances. The borough accountant observed that the Council had generally an overdraft with regard to the tramways, but if the war had not broken out there would have been a profit for the first time. The working expenses for 1915 were £7,053, and for the previous year £7,036. The loss in 1915 was £2,670, and the loss for last year was estimated at £3,500.

MANCHESTER.

THE TRAFFIC PROBLEM.

The various aspects of the congested traffic problem in Manchester were described to a Manchester audience by Mr. J. M. McElroy, general manager of the Corporation Tramways, at a lantern lecture on November 14, the subject being "The Manchester Tramways Service." The greatest volume of traffic came to the centre of the city by Oxford Road and London Road, and the question was how to relieve the congestion thereby created. He deprecated the idea of an underground railway chiefly because of its costliness. As to motor omnibuses, four times as many would be required in Rochdale Road, for example, in the busiest hours, as the present number of tramcars. The Tramways Committee were considering a proposal for the construction of parallel routes to those in Oxford Road and London Road, and terminals in Stevenson Square, Marsden Square, Cannon Street, Albert Square, and Peter Street. By this system a passenger would be able to transfer from one terminal to another and continue his penny stage. Adverting to the controversy on the question of the Piccadilly site, he suggested that the best solution of the problem would be to provide an open space, erect a public building, and allow the remainder to be used as a tramway centre. The tramway traffic in the centre of the city might be partially relieved if the cars were to turn round at Piccadilly instead of going down Market Street. The lecturer also observed that Manchester led the way in England in giving the longest penny ride, the average distance being nearly three miles.

NORWICH.

LINKING-UP POWER STATIONS.

In response to the Board of Trade's suggestion the Norwich Tramways Company have linked up their generating stations with that of the Corporation. Mr. F. W. Ketley, the manager and engineer of the company, in discussing the position of his technical staff with the local Military Tribunal stated that by taking the step referred to the company were in a position to give the city a certain amount of energy, but the Corporation were not able to reciprocate because of the difference in tension. This could not be altered without an expenditure of about £2,000 for a rotary converter and other plant.

PLYMOUTH.

THE PENNY UNIVERSAL FARE.

The general manager has presented to the Tramways Committee the traffic returns for the period from October 23 to November 11, commencing with the beginning of the through running to Devonport and the introduction of universl penny fares. It showed that during the three weeks the cars carried 1,264,978 passengers, and earned £5,371, the mileage travelled being 98,670 miles, and the average receipts 13·06d. per car mile. In the corresponding period of last year, when the tramways were worked as separate sections, and the old fares were in vogue, the number of passengers was 1,011,525, and the receipts £4,385. Mr. S. H. Phillips, chairman of the committee, considers that the innovations have been highly successful. The employees had been worked up to the limit it was thought desirable they should work, and the undertaking lacked sufficient trained drivers.

PORTSMOUTH.

LOSS ENTAILED BY DECREASED SPEED.

When an order was issued at Portsmouth for the speed of all vehicles to be reduced after sunset to eight miles an hour, the Tramways Committee, as an additional precaution, decided to reduce the average speed of the cars to 6·45 miles per hour. Consequently more cars had to be placed in service, but as there has not been a compensating addition to the revenue, it is estimated that at the end of the financial year on March 31 next there will be a loss of £4,176 to set against the amount voted for the relief of the rates.

RAWTENSTALL.

ARBITRATION ON FARES AND STAGES.

As the arbitrator appointed by the Board of Trade, Mr. J. M. McElroy, general manager, Manchester Corporation Tramways, on November 20 and 29, heard evidence in the dispute between Bacup and Rawtenstall corporations on the proposal of Rawtenstall to alter the fares and stages. The latter Council propose to increase the number of stages between Bacup and Waterfoot, so that the fares would be 1½d. from Bacup to Stacksteads and 2½d. from Bacup to Waterfoot, instead of 1d. and 2d. respectively. The contention of Rawtenstall was that Bacup passengers were getting more than their due proportion as the stages exist at present, giving them undue advantage over passengers using the length between Waterfoot and Rawtenstall. Bacup Corporation contended that the increases proposed were in Bacup borough, and held that the existing fares of 1d. to Stacksteads and 2d. to Waterfoot should not be altered.

WALSALL.

CONTRIBUTORY NEGLIGENCE IN TROLLEY REVERSING.

A Walsall car conductor claimed £50 damages in the County Court from a motor cab proprietor for personal injuries and damage to clothing sustained through being struck in the back by a cab while he was standing in the gutter to reverse the trolley-arm with a pole. The defence was that it was "plaintiff's fault if he was sauntering across the road without taking care." In dismissing the action the Judge held that there had been no negligence on the part of the driver. Even had there been negligence, he should hold that there was contributory negligence on the part of plaintiff.

YORK.

RECOGNITION OF INSPECTORS' EXTRA WORK.

York Corporation have granted the tramway inspectors an increase of 5s. per week in their wages. Councillor W. H. Sessions, in moving this payment, mentioned that the inspectors had deferred the application for a year at the committee's request, and in addition they had had their work increased by the training of 157 new drivers and conductors since the war began. As to the point previously raised about an excessive number of inspectors, it had been ascertained that whereas in other towns of corresponding size there was one inspector to about eight conductors, York had only one inspector to ten conductors. In commending the work of Mr. J. W. Hame, the manager and engineer, the chairman of the committee said he had had a great deal to contend with. A new branch had been opened to Hull Road, and a motor omnibus service inaugurated in addition to the old service, to staff which they had to train new employees. Of 105 drivers and conductors at present employed only 16 were old employees.

YORKSHIRE MANAGERS' ASSOCIATION.

At a meeting of this Association, held in Leeds on November 16, there were present Messrs. J. B. Hamilton (Leeds), W. J. McCombe (Hull), R. H. Wilkinson (Huddersfield), E. E. Nicoll (Barnsley), W. Browne (Mexborough), J. V. Moinett (Scarborough), W. McGibbon (Ossett), J. W. Hame (York), E. A. Paris (Liversedge), H. L. White (Grimsby), J. Galloway (Halifax), J. F. Caird (Halifax), J. Parkinson (Dewsbury), C. J. Jewell (Wakefield), and H. England (Wakefield). The members lunched at the Queen's Hotel, and afterwards adjourned to the tramway offices. The Secretary had received letters of apology from Messrs. Fearnley, Spencer, Cross, and Acland. The Chairman (Mr. J. B. Hamilton) initiated a discussion on the requirements of the "competent military authority" respecting the lighting of cars, and after a very full discussion, it was resolved that the Secretary should draft a letter to be sent to the "competent military authority," and also ask that a deputation from the association should be received. Among other questions discussed were advertisements on cars; depletion of staffs owing to the requirements of the military authorities, rates of pay, leaving certificates under the Munitions Act, special cars for munition workers, etc. In connection with the discussion which occurred on the rates of pay prevailing on the various tramways in the area covered by the association, it was suggested that each member should forward to the secretary a statement of the rates of pay, together with all supplementary concessions such as pay for overtime, free riding, uniforms, war bonus, and any other concession given to employees. Mr. Hamilton kindly provided tea, and on the motion of Mr. Wilkinson, seconded by Mr. McCombe, he was accorded a hearty vote of thanks.

FOR HIGH-CLASS
CONDENSING PLANT
WRITE TO
THE MIRRLEES WATSON CO., LTD.,
SCOTLAND STREET, GLASGOW.

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PATENT LIST.

Abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

*** If the inventions have been communicated the names of the communicators are given below in italics.

APPLICATIONS FOR LETTERS PATENT.

Differential gear for motor vehicles (15,600)—T. H. Cleathero and F. Spurr.
Brake apparatus for motor road vehicles (15,735)—H. Dearden.
Motor vehicles (15,604)—H. J. Dew.
Tires for wheels of railway and road vehicles for increasing adhesion and forming semi-resilient tread (15,777)—C. R. Enock.
Device for supporting and uniting rails (15,577)—R. Fryer.
Points and switches for railways and tramways (15,690)—A. Morgan.
Apparatus for operating tramway points (15,487)—C. E. Whyatt.
Electric rail and road vehicles (15,448)—J. M. & J. S. Wilson.
Driving mechanism for heavy motor vehicles (15,665)—W. G. Wilson.
Combined differential gear and engine crank shaft for motor vehicles (15,912)—S. E. Alley.
Back axle and driving gear combination (16,117)—S. E. Alley.
Motor vehicles (16,019, 16,020, 16,021, 16,022, 16,080)—Daimler Company, H. J. Balcombe, E. Boughton, and F. W. Lanchester.
Anchorage for tramway rails (15,829)—J. Gordon.
Brake adjusters (16,052)—A. E. W. Maseyk.
Means for starting engines of petrol-electric vehicles (16,032)—J. Sankey and Sons and W. A. Stevens.
Gear and brake control for motor cars (16,092)—W. G. Terrett.
Longitudinal sleepers for tracks (15,835)—O. Valeri.
Metal railway sleepers and chairs (16,426)—G. J. Fisher.
Attachment for trolley poles of electric cars (16,461)—W. James.
Motor vehicle transmission and steering (16,438)—G. W. Mascord.
Direction indicators for vehicles (16,467)—W. G. Nichols.
Live axles of motor cars (16,373)—Soc. C. Blum et Cie.
Trolley wheel guide for tramcars (16,839)—G. Askey.
Motor road vehicles (16,630)—R. Booth.
Method of supplying power to electrically propelled trains without continuous conductors (16,652)—A. Burns.
Motor vehicles (16,713)—G. M. Caulfeild and H. F. St. G. Caulfeild.
Railway coach and train propulsion (16,715).—Daimler Company and F. W. Lanchester.
Tipping bodies for trucks, motor wagons, etc. (16,932)—A. Frost and W. H. Scottorn.
Device for checking and registering number of passengers and amount of fares earned on tramcars, etc. (16,769)—W. S. Laurie.
Motor vehicle bodies (16,936)—G. Maddox.
Overhead trolleys for electric traction (16,611)—C. and R. Moore.
Tram rails (16,696)—M. E. Morgan and W. A. Morgan.
Motor omnibus seat (16,692)—C. T. Nichols.
Brakes for electric tramcars (16,749)—W. H. Turner and R. H. Wilkinson.

SPECIFICATIONS PUBLISHED.

1915.

Anti-vibration devices for use on motor vehicles (12,348)—Brophy.
Vehicles (16,721)—British Thomson-Houston Company (*General Electric Company*).
Three-point suspension for the power and speed units of motor vehicles (14,254)—Guy Motors, Limited, and Guy.
Construction of bodies for motor vehicles (14,645)—Hibbert.
Self-propelled vehicles (16,732)—Watney.
Means of adapting a light motor chassis for heavy loads (17,183)—Murphy and McGee.
Wheels and tires of motor vehicles (14,948)—Swain.
Brake mechanism (15,086)—Sloper.
Self-propelled vehicles (15,980)—Watney.
Locomotives, railway motor cars, etc. (16,030)—Baguley Cars, Limited, and Baguley.
Motor tractors (16,101)—Omnitractor Syndicate, Limited, and Smith.
Trimming of motor vehicle bodies (17,885)—Maudslay.

1916.

In the following list the numbers in italics are those that the specifications will finally bear and under which they will be indexed and abridged before acceptance and finally printed. The application numbers should, however, still be used for correspondence purposes.
Fluid pressure braking apparatus (589—*100,881*)—Westinghouse Brake Company.
Joint covers or protectors applicable to steering joints for motor vehicles (2,083—*101,576*)—S. Joseph.
Steering and fore-carriage mechanism for motor vehicles (5,146—*101,590*)—F. J. Bretherton, P. W. Robson, and Clayton and Shuttleworth, Limited.
Protector for motor vehicle tires (10,813—*101,616*)—J. W. Rooney.
Transmission brake bands for motor vehicles (6,868—*101,672*)—T. L. White.
Signalling device for motor cars and other road vehicles (4,160—*101,756*)—C. W. Bunn.
Rail joints (8,295—*101,846*)—G. Harris.
Combined variable-speed and clutch mechanism for motor driven vehicles (771—*101,896*)—G. J. Dallison.
Point or switch operating mechanism (1,266—*101,902*)—A. Tanguay, D. Quintal, and A. Robert.
Driving mechanism for motor vehicles (3,813—*101,917*)—W. O. Kuhn.
Multiple control apparatus for electric railways (10,099—*101,023*)—Akt.-Ges. Brown, Boveri et Cie.

THE TRAMWAY AND LIGHT RAILWAY ASSOCIATION OFFICES.

The Government having taken over Caxton House, Westminster, the Tramway and Light Railway Association have secured offices in Sanctuary House, Tothill Street, Westminster, nearly opposite Caxton House. The telephone number will remain as before, viz., Victoria 2110.

Colonial and Foreign Tramways Traffic Returns.

NAME OF COMPANY.	1915. WEEKS ENDED. Oct. 30	Nov. 6	Nov. 13	Nov. 20	Nov. 27	1916. WEEKS ENDED. Oct. 28	Nov. 4	Nov. 11	Nov. 18	Nov. 25	AGGREGATE. Wks.	1916.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Anglo-Argentine	48,033	54,194	53,091	51,294	52,407	52,134	53,120	52,460	53,617	52,241	48	2,401,981	+ 4,896
Calcutta ... ... Rs.	53,883	59,988	60,812	59,583	69,691	62,764	68,243	70,198	73,292	71,206	48	3,203,718	+171,557
Hong Kong ... ... $	...	...	...	...	...	...	...	...	...	...	46	623,225	+149,607
Madras ... ... Rs.	31,293	(2 weeks)	29,441	(2 weeks)	...	31,519	(2 weeks)	31,596	(2 weeks)	...	45	665,506	+ 47,182
Pernambuco ... ... $	2,968	3,240	3,189	3,283	3,098	3,166	3,453	3,504	3,555	3,400	47½	144,447	− 716

Companies Issuing Monthly Statements.

	1915. June	July.	Aug.	Sept.	Oct.	Nov.	1916. June.	July.	Aug.	Sept.	Oct.	Nov.	Wks.	AGGREGATE. 1916.	+ or −
	£	£	£	£	£	£	£	£	£	£	£	£		£	£
Ballarat & Bendigo ...	2,692	2,677	2,860	3,075	3,401	...	2,793	2,704	2,791	2,850	3,390	...	28	22,110	+ 600
Brazilian Traction Mlrs	6591940	6703000	6576000	6494000	6793000	...	6961000	7195000	7184000	7037000	...	...	44	68,286,000	+ 4,035,890
Brisbane	29,880	31,150	35,064	30,360	31,880	31,120	31,390	32,880	37,900	32,530	32,760	26,740	48	357,160	+ 10,086
British Columbia $	498,093	510,723	507,126	517,022	538,826	...	529,078	538,293	550,293	540,440	573,544	...	18	2,202,570	+ 128,873
Buenos Ayres Lacroze	40,421	41,460	41,468	39,355	43,516	46,033	36,213	38,439	36,431	37,075	39,670	42,603	22	207,402	− 16,614
Burma	...	...	25,159	22,163	...	...	...	...	24,412	23,749	...	...	9	48,161	− 839
Cape Town	...	...	...	...	...	...	12,920	13,357	13,394	...	14,238	...	—	—	—
Carthagena & Herrerias	2,059	2,157	1,523	1,252	2,169	2,090	3,512	2,371	2,081	1,779	2,539	2,252	48	27,391	+ 7,552
Cordoba	14,059	14,375	14,159	13,210	13,441	...	14,129	14,263	13,852	13,389	13,533	...	31	98,087	+ 740
East India	2,194	2,231	2,266	2,054	2,069	2,065	2,283	2,220	2,522	2,523	2,080	1,942	17	9,067	+ 613
Kalgoorlie	2,707	2,775	3,165	2,997	...	...	2,500	2,521	3,021	2,788	...	...	39	23,267	− 1,849
La Plata	3,875	4,054	4,164	3,894	4,405	4,564	3,735	3,909	3,792	3,994	4,435	4,342	48	46,399	− 429
Lima	...	...	32,004	30,530	32,211	...	...	...	33,395	33,348	33,292	...	44	337,350	+ 16,858
Manaos ... Rs.	...	...	...	...	...	...	144,913	152,380	147,774	141,286	...	...	—	—	—
Manila	...	23,750	...	...	...	...	...	...	33,700	...	...	...	31	887,739	+ 39,986
Melbourne	...	...	...	...	...	...	69,275	...	...	...	...	...	—	—	—
Mexico ... $	...	...	...	...	...	...	...	...	...	...	...	...	—	—	—
Monte Video	24,266	25,161	26,494	25,070	27,167	28,407	25,300	25,220	25,044	26,711	...	28,404	4	28,404	− 3
Peruvian ... $	759,374	724,838	819,039	755,280	806,900	751,720	929,500	835,430	895,900	911,910	945,590	925,820	22	4,514,650	+ 656,873
Port Elizabeth ...	...	...	...	...	...	...	2,809	3,166	2,863	...	3,131	...	—	—	—
Rangoon	4,997	4,629	4,510	4,445	4,886	5,028	4,205	4,357	4,253	4,137	5,043	5,033	48	51,404	− 1,839
Toronto ... $	787,558	773,013	762,627	804,902	792,001	...	884,491	867,789	889,241	913,535	907,460	...	44	8,913,224	+ 970,618
Winnipeg ... $	255,549	248,022	251,189	261,982	286,146	..	254,686	242,688	249,795	267,497	278,817	...	44	2,740,271	− 59,324

(Continued on page 432)

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TRAFFIC RETURNS—*continued.*

Tramways and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1915. WEEKS ENDED.					1916. WEEKS ENDED					AGGREGATE.		
	Oct. 30	Nov. 6	Nov. 13	Nov. 20	Nov. 27	Oct. 28	Nov. 4	Nov. 11	Nov. 18	Nov. 25	Wks.	1916.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Aberdare U.D. Council	373	346	402	339	...	403	426	450	363	...	34	13.518	- 1.543
Aberdeen Corporation	1,619	1,838	1,861	1,606	1,573	1,771	1,841	1,958	1,817	1,770	29	48.675	- 2,891
Accrington Corporation	526	511	504	504	...	560	540	552	550	...	33	19.376	+ 794
Ayr Corporation	245	239	251	229	224	278	272	271	265	262	--	12.976	- 1,148
Bath Electric	*	...	...	...	...	...	...	...	...	...	--	--	--
Birkenhead Corporation	1 314	1.317	1.362	1,286	1.232	1,547	1,594	1,546	1.444	1.514	34½	53 405	- 5.664
Birmingham Corporation	15,023	15.212	15.355	15,229	14.752	15,133	14,377	14.462	13.047	12.675	34	550.554	+ 60,733
Birmingham Corp. Motor Omnibuses	815	806	804	798	768	962	1.014	1.044	1,108	1.069	34	34.548	+ 4.939
Blackburn Corporation	1.087	1.099	1.080	1.065	1.004	1,158	1,086	1,109	1.139	1.021	34½	44,120	- 981
Blackpool and Fleetwood	356	425	291	284	247	379	435	345	297	284	47	42.411	+ 4,869
Blackpool Corporation	*	...	...	...	...	...	...	...	...	...	--	--	--
Bolton Corporation	2,581	2.600	2 583	2.461	2,402	2.737	2.884	2.853	2.661	2.702	35	100.982	- 7.321
Bournemouth Corporation	1.771	1.728	1.733	1.559	1,587	2.049	2.047	2,082	1.832	1.891	35	83.146	- 6.754
Bradford Corporation	5,914	6,482	6,020	5.856	5,739	6,358	6.392	6,223	6,263	5.990	34	235.805	+ 8.490
Brighton Corporation	940	951	918	844	811	1.133	1.097	1,127	971	1.015	34½	45.358	- 4.965
Bristol	8,910	9.651	9.718	9,596	9,634	9.811	10.480	10.124	9.762	9.351	47	474 995	- 23.826
Burnley Corporation	1,560	1.492	1.488	1.425	1.404	1.595	1.696	1.574	1.535	1.523	35	60.058	+ 3.503
Burton-on-Trent Corporation	262	269	281	258	244	285	287	272	263	263	34	9.589	- 474
Bury Corporation	1,291	1,252	1.237	1,146	1,097	1.274	1.343	1.313	1.220	1.223	34½	50.112	- 2,450
Cardiff Corporation	2.490	2.452	2.539	2,392	2.388	3.004	3.018	2.995	2,858	2.871	34	104.246	- 10.516
Chatham and District	1.061	1,082	1.070	988	970	1,212	1.234	1,179	1.191	1.049	47	58 061	- 3,181
Chesterfield Corporation	258	248	260	256	249	237	242	256	260	232	34	9,585	+ 278
Colne Corporation	278	238	234	219	210	250	258	245	249	240	...	...	--
Cork Electric	486	461	473	442	425	493	499	493	514	457	47	24.092	- 453
Croydon Corporation	*	...	...	...	...	...	...	...	...	...	--	--	--
Derby Corporation	975	979	1.055	979	917	1,113	1,160	1,134	1.010	1.008	34½	39.455	- 2,919
Dover Corporation	*	...	...	...	...	...	...	...	...	...	--	--	--
Dublin and Lucan	135	126	115	103	99	151	130	126	130	110	21	3,566	- 291
Dublin United	5 833	5.784	5,880	5.513	5 351	6.164	6.250	6.040	6.162	5 830	47	286.584	- 715
Dundee City	1.321	1.354	1.388	1,267	1.231	1.354	1.369	1.363	1,355	1.326	27½	38.582	+ 936
East Ham Corporation	1.246	1.200	1,222	1.225	1 215	1.251	1.284	1.222	1,192	1.120	34½	45.215	+ 153
Exeter Corporation	340	333	347	304	292	377	388	389	372	388	34	14.061	- 755
Gearless Motor 'Buses	*	...	...	...	...	...	...	...	...	...	--	--	--
Glasgow Corporation	21,866	21.877	21,795	19,687	20.261	23.936	23,785	23.694	23.463	23.246	25½	599,699	- 46,434
Glasgow Subway	1.182	1.156	1,192	1.300	1,242	1,219	1,255	1,220	1,236	1,251	47	54.139	- 4 331
Glossop (Urban Elec. Supply Co.)	127	122	124	122	119	140	145	139	134	134	48	6,688	- 667
Halifax Corporation	2,007	1.935	2.033	1,885	1,857	2.097	1,875	2,021	1.980	1.774	33½	77.055	- 955
Halifax Corp. Motor Omnibuses	44	40	42	40	39	49	47	49	47	44	33½	1.696	-- 19
Hastings and District	739	761	790	706	674	836	808	829	771	728	47	49.259	+ 3.175
Huddersfield Corporation	2.450	2.440	2,512	2.391	2,357	2 661	2.722	2,657	2,575	2.512	34	98.147	+ 8.441
Hull Corporation	2,982	3.139	3,104	3 094	3,088	3.119	3.218	3,244	3,151	3.071	34	107.448	- 1.873
Ilford U.D. Council	582	582	585	574	...	625	651	640	587	...	33	23.042	+ 1.246
Ilkeston Corporation	*	...	...	...	...	...	...	...	...	...	--	--	--
Ipswich Corporation	493	474	480	446	434	436	437	419	416	395	34	18.150	— 1,096
Isle of Thanet	246	250	248	219	211	258	286	279	245	235	8	2.269	+ 23
Kilmarnock Corporation	163	153	156	147	143	177	169	172	168	171	27½	4,934	+ 159
Lanarkshire	2.001	2.144	2,019	1,904	1,803	2.448	2,312	2 267	2,340	2,167	47	109,002	+ 15.808
Lancashire United	1.617	1.613	1.596	1.537	1.501	1.869	1.774	1.815	1.803	1.667	47	86.392	- 4.876
Leeds City	8.314	8.736	8 748	8,437	8,206	9.585	9,641	9.417	9,418	9,146	35	339,700	- 30.915
Leicester Corporation	*	...	...	...	...	...	...	...	...	...	--	--	--
Leith Corporation	749	738	728	670	661	842	864	846	834	811	27½	24.707	+ 3.117
Leyton U.D. Council	1,506	1,409	1,471	1.458	1.426	1,449	1.520	1,503	1.512	1.351	34	57.297	+ 1.053
Liverpool Corporation	12.963	12.873	13,052	12,505	12.383	14.265	14.321	14.230	13,983	13.676	47½	666.257	- 37.828
Llandudno and Colwyn Bay	215	213	190	187	171	254	221	221	213	199	51½	18.610	- 1.221
London County Council	44,334	43,741	44,703	44,493	...	47,016	47,482	46,549	47,356	...	32½	1,596,652	- 152,038
London General Omnibus	*	...	...	...	...	...	...	...	...	...	--	--	--
London United	*	...	...	...	...	...	...	...	...	...	--	--	--
Lowestoft Corporation	*	...	...	...	...	...	...	...	...	...	--	--	--
Maidstone Corporation	182	189	190	179	168	197	196	197	199	176	34	7.610	- 95
Manchester Corporation	17,621	17 151	17,455	16,342	16,006	18 678	18,641	18,514	18,108	17,928	32	650,074	- 36,389
Metropolitan Electric Tramways	*	...	...	...	...	...	...	...	...	...	--	--	--
National Steam Car	*	...	...	...	...	...	...	...	...	...	--	--	--
Nelson Corporation	194	172	187	...	...	214	198	185	...	...	32½	6.993	- 538
Newcastle-on-Tyne Corporation	6,388	6.375	5.799	5 596	5.597	6,985	6.998	6 918	6,772	6.572	34	230.739	- 13.987
Newport (Mon.) Corporation	783	773	814	752	735	961	1.057	959	929	970	34	33.151	- 4.031
New St. Helens and District	897	902	901	882	846	1.085	1.056	1.049	1,039	922	21	24,408	- 1,914
Northampton Corporation	651	635	664	629	592	714	735	739	724	720	34	24.595	- 768
Nottingham Corporation	3,561	3,478	3,635	3,559	3,433	3.939	3.859	3,904	3,923	3,608	34	134.804	— 6,270
Oldham Corporation	2.250	2.148	2,123	2.006	1,928	2.214	2.347	2,294	2,108	2 226	35	87.683	- 5.197
Portsmouth Corporation	2,054	2.126	2 066	1 960	1,908	2.464	2.404	...	2,144	2,163	...	...	...
Preston Corporation	909	941	934	927	906	1,137	1,130	1,132	1,106	1,067	33½	37.926	+ 4,850
Provincial	1,996	2 036	2,018	1,945	1,877	2.134	2.046	1,986	1.927	1,866	8	16.864	+ 325
Reading Corporation	757	723	759	714	679	859	904	850	838	801	33½	29.604	+ 2.467
Rhondda Tramways	1,170	1,185	1,179	1,186	1.109	1.384	1.326	1.273	1.301	1.202	47	60.650	+ 5.293
Rochdale Corporation	1.586	1.573	1.582	1,472	1 411	1.611	1,655	1,624	1.521	1.509	34½	62.180	— 2,458
Rotherham Corporation	1,274	1.196	1,174	1,140	1,138	1.588	1.629	1,654	1 546	1.600	34½	54.569	+ 13.817
Salford Corporation	5.051	4,928	4.919	4,656	4,586	5.231	5,401	5,370	5,056	5,165	33½	191.088	— 9,309
Sheffield Corporation	9,008	9.275	9.299	9.086	8.936	10.489	10.588	10.849	10,353	10.585	35½	371.844	- 56.898
Southampton Corporation	1,426	1,451	1,438	1,426	1,277	1,623	1,771	1,676	1,666	1,512	33½	57.554	- 5.605
Southend-on-Sea Corporation	614	607	561	576	545	685	699	691	693	602	34	33,602	+ 3.945
South Metropolitan Tramways	*	...	...	...	...	...	...	...	...	...	--	--	--
South Shields Corporation	761	751	735	700	702	815	821	790	828	805	34½	29.103	+ 1,527
Sunderland Corporation	1,428	1.469	1.424	1,379	1.381	1,625	1 631	1.631	1.555	1,628	34	56.921	+ 4,668
Sunderland District	573	544	536	510	553	698	575	644	646	625	4	2.561	+ 418
Swindon Corporation	172	179	170	173	165	200	199	196	207	192	33½	7.050	- 290
Torquay Tramways	427	419	398	386	364	520	498	454	480	434	47	28 217	+ 2.367
Tramways (M.E.T.) Omnibus Co.	*	...	...	...	...	...	...	...	...	...	--	--	--
Tyneside Tramways and Tramroads	539	540	521	495	494	611	582	589	617	525	21	14.172	+ 1.171
Wallasey Corporation	1.093	1,081	1.123	1,060	1.026	1.221	1.222	1,197	1,197	1,148	30½	48 295	+ 3.114
Walsall Corporation	767	762	782	769	730	822	814	808	807	747	48	38.775	+ 3,442
Walthamstow U.D. Council	708	703	721	718	696	979	992	949	933	912	34	38.308	+ 6.653
Warrington Corporation	448	467	462	465	438	509	525	522	513	491	34	17.413	+ 1.469
West Ham Corporation	2.881	2,761	2.870	2,831	2.778	3.091	3.160	3,027	2,997	2.781	33½	110.645	+ 4.734
Wigan Corporation	1.682	1,509	1,540	1.497	1,347	1,720	1,701	1,723	1,701	1,641	34	57,730	+ 5,073
Wolverhampton Corporation	*	...	...	...	...	...	...	...	...	...	--	--	--
Yorkshire (West Riding)	1,398	1,715	1,502	1,420	1,419	1,672	1,801	1,886	1,569	1,675	48	84,514	+ 8.752

* TRAFFIC RETURNS SUSPENDED.

Owing to the European war, the Government have taken over the railways of Great Britain as from August 4, 1914, and the issue of traffic returns has been suspended. Consequently the traffic returns of the electric railways which usually appear on this page cannot be given.

The Publication of the Traffic Returns of the Tramways marked with an asterisk in the above table have also been suspended during the war.

TRAMWAY DIRECTORIES.

A useful feature of this issue is the directory of electric railways and electric tramways which will be found among the advertising pages. This directory contains the names of the chief officials and the principal particulars relating to each undertaking.

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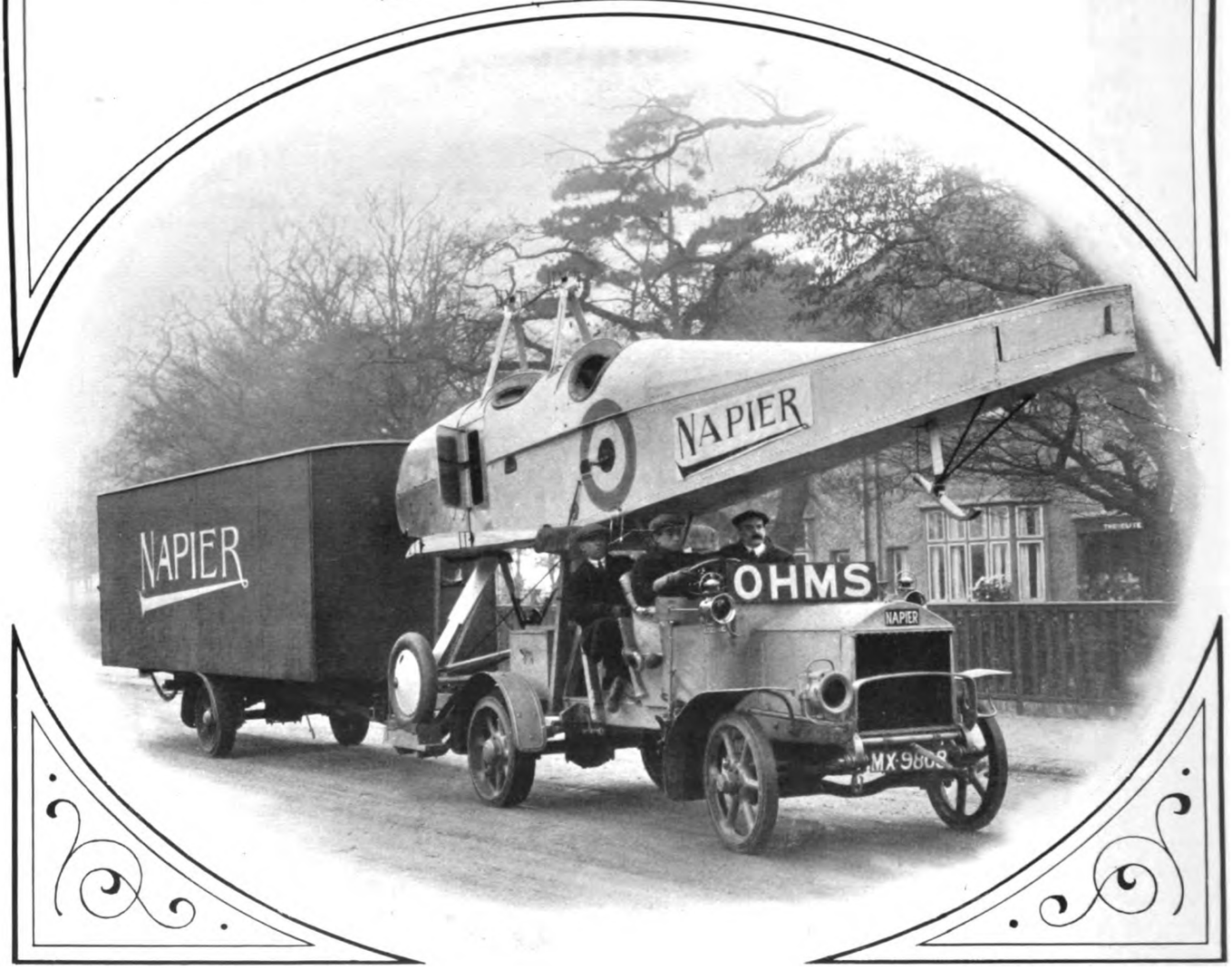

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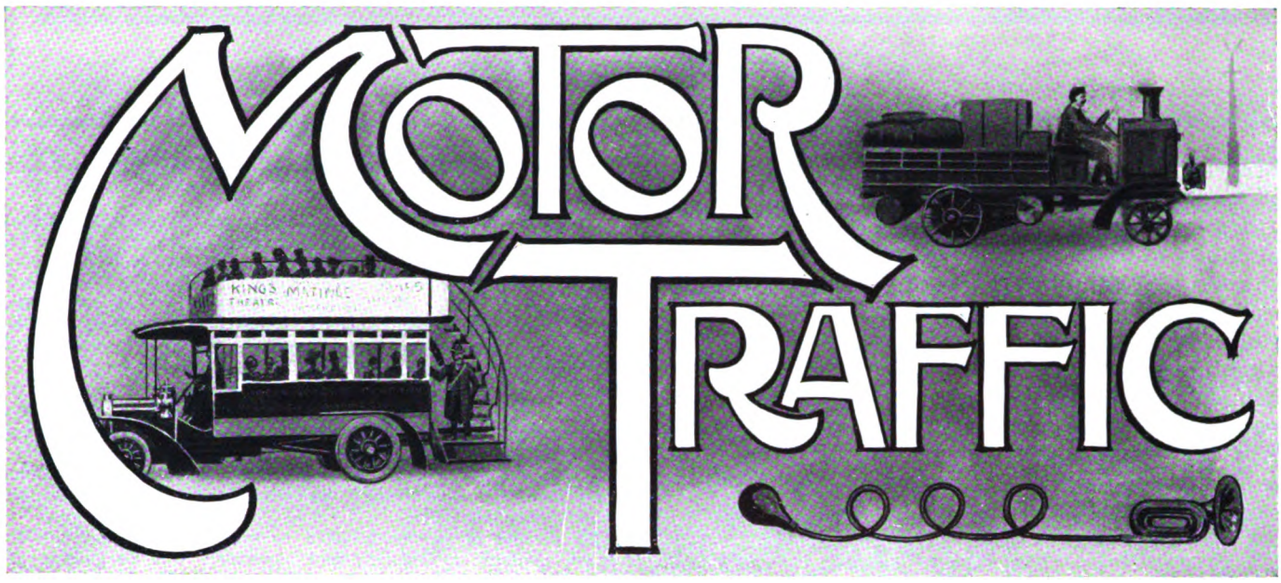

The war has taught us many lessons, and has played havoc in all directions with preconceived ideas. So far as transport has been concerned it has done much to alter previous impressions as to the relative importance and functions of road and railway. In the few years immediately preceding 1914 we had witnessed a sort of renaissance of road traffic, owing to the growing efficiency of motor vehicles, but it seemed to be generally accepted that such revival could only be partial and limited, and that its scope would eventually prove comparatively narrow, and, in any case, much more restricted than enthusiasts were inclined to admit. The war has to a very large extent justified the enthusiasts, however, and proved the cautious folk to be in the wrong. The possibilities of the motor lorry have been shown to be far wider and more multifarious than all but a select few would have predicted. One does not need to refer to such exploits as those of the Marne, Egypt, and the Caucasus to support this contention. More apposite and more striking than any of these is the almost epic story of the lorries of Verdun, where it was proved beyond all doubt, for the first time, that one road, a sufficiency of motor lorries, plus adequate organisation, was an efficient substitute for a railway line. Had it not been for this "endless chain" of motors, the state of Verdun would have been one of siege, the fortress could not have been supplied, and its fall could scarcely have been obviated. The reason why this achievement stands out so pronouncedly from all others of the war is that it affords the one great example of the successful use of motor transport in an operation which, although purely warlike, has some bearing on what might be required under less exciting conditions. There can, of course, be no actual comparison between the task of supplying a city attacked by a powerful and relentless enemy, requiring to be munitioned as well as victualled and generally supplied, as against that of meeting the wants of that same city in times of peace, because the conditions at Verdun during those fateful weeks were at least a hundred times more exacting than they would be in normal times. We are, therefore, entitled to regard this exploit as an outstanding proof that the proposition that a road and mechanical transport thereon may render a railway unnecessary, can no longer be dismissed as impracticable.

* * * * * *

By the time the war has come to an end we shall have acquired a great deal of fresh knowledge, not only on the subject of motor transport, but on the transport problem in all its ramifications. On that score we are believed to suffer under peculiar disabilities in this country, and in the process of reconstruction that must come with peace we might do worse than bend our energies in the direction of investigating the nature and extent of our present deficiencies, and set to work to remedy them where they are found to exist. One word of warning, however, is necessary. Such an investigation must proceed with a perfectly open mind. Its concern must be to consider the transport problem *as a whole*, and to decide how, with the various means at our disposal, we may obtain the best and most economical service all round. There is no doubt that a good deal of the work done by the railways might better be performed by road vehicles, given the necessary facilities, and, conversely, some, at least, of the facilities given by motor vehicles, both as to goods and passenger carrying, are not easily defensible, either on economic grounds or those of public policy. If we are not to have regrettable loss and waste of effort and resources in the future, it is absolutely essential that we should avoid a state of cut-throat competition between various systems of transport. There is work for all of them to do, and whilst the community may appear to profit for a while from their competition one against the other, such profit is always illusory, especially when a broad view of its effects is taken.

With the coming of the longest and darkest nights of the year the question of safety in the streets acquires renewed urgency. Although there is a very welcome drop in the numbers of street casualties in London for the 12 months ended October 31, there has been during the last few weeks a most disturbing upward tendency in the statistics of inquests held upon people killed in the streets at night. In one district recently there were three such cases in a single day, and in another no less than five. We must, of course, accept the restricted lighting as necessary in the present circumstances, and make the best of it. But it is a striking fact that some districts seem to suffer far more heavily than others, and although there are obvious reasons why the mortality rate from this cause should be higher in Central London, as compared with localities outside that area, it is difficult to understand the variation in the figures as affecting one district against another where traffic conditions are more or less analogous. For this there must be some specific cause, but it requires a certain amount of observation to

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MOTOR TRAFFIC.

discover it. It must, however, have occurred to many whose movements in London are not confined to one particular quarter that there is a noticeable want of uniformity in the measures adopted, both in restricting lighting and in regard to the extra precautions taken to meet the present abnormal conditions. For instance, in adjacent localities will be found the greatest diversity in lighting; in one all the street lamps are lighted but obscured with green pigment, in the other no street lighting whatever. In some of the London boroughs kerbs are whitened, in others they are not. The use of such safety devices as red lamps at traffic centres, or on refuges, again is left to purely local initiative.

* * * * * *

These somewhat inexplicable variations as between various London districts—for there is obviously no rhyme or reason in them—exist to an even greater extent as between different towns in the provinces. On the whole, the restrictions are much more drastic in the provinces than in the metropolis, and the increase in the numbers of street casualties is proportionately much higher than in London. This state of things appears, on the face of it, to be quite needless. It may be advisable to darken towns, say, in Lancashire to the same extent as London, but what case there is for carrying the curtailment farther it is difficult to imagine. Their risk from enemy aircraft is demonstrably no greater than that of London, to say the least, while the increase in the numbers of deaths from street accidents is, conservatively speaking, no less. There must be a mean between the requirements of safety to people moving about in the streets and the necessities of the air menace, and there seems to be no grounds as to why it should not be properly ascertained and applied uniformly all over the country. In the same way safety precautions should be standardised, so that drivers are not subject to the confusion and danger inevitable in passing from one locality where obstacles are lighted to another where they are not, or from streets in total darkness to others in which there is at least a modicum of illumination. Methods of traffic regulation and local police practice should be co-ordinated, and for this and the other purposes referred to a conference of police authorities and local representatives might well be called. Some measure of the kind is all the more necessary because throughout the country the lighting restrictions now in force relatively to those of last year are much more pronounced. This applies individually as well as generally, and the result is that the places that were very dark in comparison with others last winter are now darker still, and thus the lack of uniformity and standardisation is even accentuated.

THE DEFINITION OF MOTOR SPIRIT.

The Commercial Motor Users' Association obtained an official interpretation of the meaning of the term "motor spirit," over which there has been controversy since the Order in Council of August 18. A communication was forwarded to the Home Office strongly representing "the expediency of issuing an immediate instruction to chief constables to allow no prosecutions to be instituted under the Order unless the fuel in question pays the petrol tax." The association have now been informed by the Home Office that, after consultation with the Board of Customs and the Board of Trade, the Secretary of State has made a suggestion to the police forces on the lines suggested.

RELAXATION OF PETROL RESTRICTIONS.

The Petrol Control Committee announced on November 7 that new licences (free of duty) for the purchase of motor spirit for use in hackney and commercial vehicles and in industral processes will be issued to holders of licences which expired at the end of the month. The new licences will cover a period of six months. An application for the renewal of a licence which expired in November should be made on the form attached to the licence at page 7, and should have been sent to the Secretary, Petrol Control Committee, 19, Berkeley Street, W., between November 16 and 25. Holders of free-of-duty licences who for special public services have already received a supplementary allowance of motor spirit cannot be granted any further increase. The Committee are prepared to consider applications from those who have not received a supplementary allowance for an increase not exceeding 10 per cent. of the amount authorised in their existing licences.

The number of gallons allotted to motor cabs in London for August, September, October, and November was 60 gallons per month per cab. For the month of December, according to a statement in Parliament, the allotment will be 90 gallons.

MOTOR CABS AND THE RESTRICTION REGULATION.

The Cardiff stipendiary magistrate, on November 15, decided that a motor cab does not come within the scope of the regulation under the Defence of the Realm Orders restricting the use of motor spirit. The case was brought as a test action by the Watch Committee, the defendant being summoned for unlawfully using motor spirit to drive a cab on a pleasure trip. The summons was dismissed.

PERMITS FOR MOTOR CONSTRUCTION.

On November 6 the Minister of Munitions gave notice that he "prohibits until further notice any person, firm, or company engaged in the manufacture or repair of any vehicle designed for mechanical transport or traction, or any part of such vehicle, from carrying out in any factory, workshop, or other premises, without a permit issued under the authority of the Admiralty, the Army Council, or the Ministry of Munitions, any work consisting in the manufacture, assembling, or erection of any new or unused motor internal combustion engine, designed or adapted for mechanical traction, or of any new or unused motor cycle, motor chassis, motor wagon, or of any tractor or other motor vehicles of any kind propelled by mechanical means, except work required to complete contracts placed by the Admiralty, the War Office, the Ministry of Munitions, or an Allied Government, on or before the date of this Order." Repairs or replacements are not affected by the Order.

DEPUTATION ON ARTERIAL ROADS.

Replying to a deputation on November 1 on the subject of arterial roads in Greater London, Mr. Long, President of the Local Government Board, said that all he could do at present was to ask Sir Geo. Gibb, as head of the Road Board, to examine the schemes, and they would no doubt report to the Government in due course as to the relative importance of the roads. The deputation represented 137 municipal authorities and professional bodies of Greater London, and the report placed before Mr. Long was the outcome of the work of conferences held during the past eight years under the chairmanship of Ald. Regester, chairman of Middlesex County Council. That gentleman informed Mr. Long that the conference had come to an almost unanimous approval of the proposed roads suggested by the late Traffic Branch of the Board of Trade. The deputation did not expect that the money should be spent at present, but it was of great importance that the course of these roads should be laid down, so that town planning schemes around London might be developed in accordance with the scheme. Mr. G. H. Hume, chairman of the Highways Committee of the London County Council, stated that that body were not committed to the scheme, but it was essential that they should be prepared to deal with the traffic put upon Inner London.

SHELTER FOR OMNIBUS PASSENGERS.—The company running the motor omnibuses which link up Dover with places inland are about to erect a shelter for passengers in Saxon Street, Dover. There will be standing for six vehicles. The Town Council have agreed to the use of the site.

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MOTOR TRAFFIC.

MOTOR VEHICLE PROGRESS.

TWENTIETH ANNIVERSARY OF THE ABOLITION OF THE RED FLAG.

November 14 was the twentieth anniversary of the date upon which the Locomotives on Highways Act, 1896, came into force. Upon that day in 1896 the small number of automobilists then existing celebrated by a run from London to Brighton their emancipation from the traction engine enactment that required their cars to be preceded by a man carrying a red flag. Prosecutions for infringements of the law had taken place in various parts of the country. A regulation made by the Local Government Board under the new Act fixed the maximum speed of the cars at 12 miles per hour, although a speed two miles higher was mentioned in the Act.

It was under the lower speed that the procession to Brighton, organised by the Motor Car Club (now the Royal A.C.) was conducted, but that was not a matter of importance, for only about half of the 35 machines completed the journey. In our issue of December, 1896, we observed that "nobody doubted that horseless vehicles could do in England what they had done in France, nor did anyone expect that the mere removal of legislative restrictions in England would at once convert imperfect machines into practical and efficient means of transport. But we would not minimise the importance of the new industry. It will no doubt in time prove of great benefit and flourish exceedingly."

Great progress in reliability was achieved in the years intervening before the Motor Car Act of 1903 was introduced in the House of Lords. This measure raised the speed limit to 20 miles per hour, and instituted the use of registered numbers. The Act came into force on January 1, 1904, but its passage was not secured without great opposition, much of which was based on the dust that motor vehicles then raised on roads not constructed for fast traffic. The leaders of the automobile movement in the Legislature were Lord Montagu, who has recently gone to the East as Inspector-General of motor transport; the Hon. Arthur Stanley, chairman of the Royal A.C., who has done such valuable work as head of the Red Cross movement during the war; and Sir Henry Norman. The Act has since been renewed from year to year, and although a Royal Commission sat in 1905 to consider its working and to suggest amendments, the numerous recommendations that they made have not been carried out.

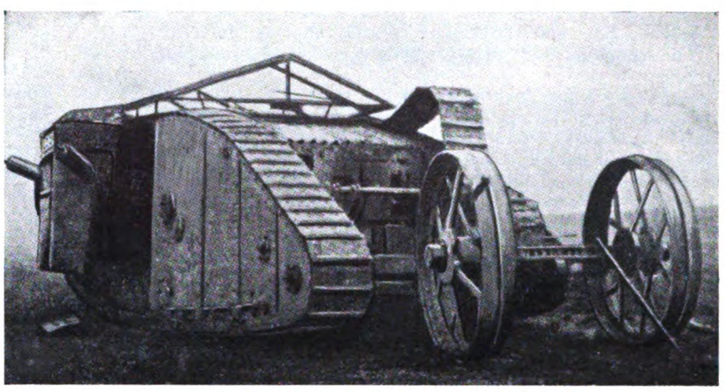
An unlooked-for advance was made in 1909. In return for motorists consenting to the imposition of increased payments for licence and petrol duty, funds were allocated by the Government to a new department set up under the title of the Road Board, and charged with the duty of securing improved roads and making grants to local authorities for construction. The outbreak of the war has led to the suspension of a number of important schemes that the Board proposed to undertake, including the classification of roads. The same cause has also brought about a cessation of activity in other departments closely affecting commercial and public passenger vehicles. A technical difficulty in the Finance Act of 1913 had caused the withdrawal of the Government's scheme for increased road grants to local authorities. The question of the taxation paid by those two classes of vehicles was also under consideration, while a departmental committee of the Local Government Board had entered upon the task of considering matters connected with the weights of the machines and their tire widths.

The motor vehicle in this country owes its development, apart from the club movement, to the support of wealthy purchasers and to the enterprise of makers in producing racing cars, notably for the Gordon-Bennett international race. As long ago as 1899 the War Office, after two years' consideration, expressed approval of the practicability of motor transport vehicles, but it was not until 1909 that the trials for subsidy vehicles were instituted. During the intervening years the War Office had in 1901 offered prizes in trials of self-propelled vehicles which were required for the South African war, when Thornycroft and Foden vehicles were selected. The credit for the first encouragement of the commercial or heavy vehicle belongs to the Royal Agricultural Society of England. In 1898 this society organised trials for motor vans at their Birmingham show, when the Daimler Motor Company secured the first award for light vans. The next organisation to foster the heavy side of the movement was the Liverpool Self-propelled Traffic Association, which carried out a number of trials, beginning in 1901. Only a year before that date the Automobile Club had carried out their first 1,000-mile reliability trial for private cars, following an exhibition of vehicles at the Agricultural Hall. In 1903 there was another 1,000-miles reliability trial for tourist cars, accompanied by an exhibition at the Crystal Palace.

It was not until 1907 that the club organised a 1,000-mile trial for commercial vehicles, in connection with which the timorous War Department gave certificates for vehicles using petroleum fuel and suitable for military work.

MANNING OF THE "TANKS."

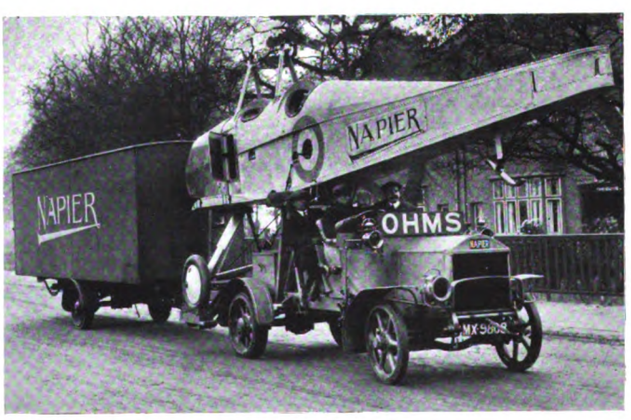
Apropos of our illustration of an armoured car propelled by petrol on the caterpillar system of traction, it is of interest to state that although one or two have been disabled in the capture of the German positions, the enemy has not managed to secure one. A correspondent serving in the Motor Gun Corps writes:—"An element of over-eagerness, as well as other things, has been the principal reason for a few of the 'Tanks' being knocked out, but that is a cause that will soon rectify itself. Except for the somewhat cramped position inside and the inconvenience of the heat and fumes, the general impression among the men is one of security, most of our casualties having occurred through members of the crews coming out of the cars in order to see what was going on. Only a dull uproar reaches the ears of the occupants inside, as, apart from the fact of being closed up, the noise of the engines makes the report of your own guns seem dull."



Rear View of a "Tank," which had seen Service.

NAPIERS IN THE AIR SERVICE.

The extent to which the products of the works of D. Napier and Son, Limited, are utilised for war as well as for peace is partly indicated by the appended illustration. The firm has supplied hundreds of heavy motor vehicles for national and business purposes, and there has also been a great demand for their light car chassis for the use of the services and also for ambulances. From time to time our illustrations have shown what a valuable work the Napier commercial vehicles are doing in transporting goods to and from railway trucks in the great centres of industry. The present picture provides another aspect of the many-sided activities of the Napier machines both on and above the earth.



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MOTOR TRAFFIC.

OMNIBUSES ON RURAL ROADS.

DAMAGES AWARDED AGAINST OXFORD TRAMWAYS COMPANY.

In the King's Bench Division, on November 15, Mr. Justice Sankey gave judgment in the action Abingdon Rural District Council *v.* City of Oxford Electric Tramways, Limited, in which the Council claimed £498 as expenses incurred in repairs to Foxcombe Hill Road and Wootton Road, between Oxford and Abingdon, because of damage done by the excessive weight and extraordinary traffic of defendants' motor omnibuses. Defendants denied that they had subjected the roads to excessive weight or extraordinary traffic, or had caused any damage to the roads, and they asserted that the roads had not been properly maintained and repaired. Mr. Clavell Salter, K.C., and Mr. Willoughby Williams appeared for plaintiffs, and Mr. Vesey Knox, K.C., and Mr. Eustace Hills for defendants.

Solicitors :—Messrs. Church, Adams, and Prior, for Messrs. Challenor, Son, and Welch, Oxford ; Mr. Sydney Morse.

The arguments of counsel which preceded the judgment are of interest.

Mr. Vesey Knox, for the defendants, submitted that it was clearly established by the evidence of the Council's own witnesses that these roads were, broadly speaking, of the main road type, bearing main road traffic, and were not ordinary agricultural roads. The point, therefore, could not be taken by Mr. Salter that these were agricultural roads and the defendants should have taken main roads for their service. This was the first case in which the claim had been made that motor omnibus traffic was "extraordinary traffic." The burden of proof lay upon the plaintiff Council. These omnibuses were ordinary motor omnibuses, and the case in regard to alleged excessive speed had completely broken down. In no case had there been a claim by a Council that motor omnibus traffic was extraordinary traffic. Other District and Rural Councils had not thought fit to bring such a case, although plenty of localities could be referred to where roads of a more rural character had motor omnibus traffic. All over the country local authorities and men who were well acquainted with the needs of their particular localities had had to deal with these problems, and had never brought such a case into the High Court. The fact that there had never previously been such a case was a clear indication of the general sense of the community that in these days motor omnibuses were of the common order of traffic. They were not so 20 years ago, but they were to-day. They had evidence of the use of the road by motor cars, and now motor omnibuses had arrived, which were for the general use of the public for whom the roads were provided.

Mr. Justice Sankey said he could quite understand that extraordinary traffic might become ordinary traffic, but he had difficulty in seeing that it could be called ordinary traffic when first it started on the road.

Mr. Vesey Knox said that the position here was this at first there was a horse omnibus service, then a small motor omnibus service, and then the latter was increased as the demands increased. The present traffic was therefore being run on roads that had horse omnibuses previously, and the present form of traction merely represented an improved form. There might be found expressions in some of the judgments that suggested that traffic could be extraordinary because it was new, but this was stretching the meaning of the term "extraordinary" rather far. Here the roads had had a form of locomotion before this alleged extraordinary traffic was started.

Mr. Clavell Salter, on behalf of the plaintiff Council, in reply, said that if he proved that this was in fact extraordinary traffic, and that extraordinary expense had been thereby occasioned, he must succeed in the action. The defence had suggested that there had been non-repair of the highways—that the roads were not sufficiently and adequately maintained for the ordinary traffic of the neighbourhood. He submitted that the latter defence was not established, and if it was established that it was not a defence open to the defendants under this section. The question of whether traffic was extraordinary or not must always be considered in regard to the particular locality ; it was purely and absolutely a question of fact upon the circumstances of the case. Therefore he contended that the only question was whether, having regard to these particular roads, this traffic that had come upon them was extraordinary upon these roads. An attempt had been made to introduce matters that were entirely outside of the section. He contended that the case was fully proved.

Mr. Justice Sankey, in giving judgment, said (according to *The Times* report) that the road along which defendants began to run omnibuses in 1914 left the main road from Oxford to Abingdon about two miles out of Oxford, and took a south-westerly direction to Foxcombe Hill. In the neighbourhood there was a new residential district known as Boars Hill. The omnibuses then went to Abindgon along Wootton Road. He found as a fact that the road from Foxcombe Hill to Wootton Road was a country lane, more or less, that there was hardly any traffic along it before the omnibuses came, except that of a few carts ; and that the road was very narrow and tortuous. Wootton Road was a better road, but did not approach the character of a main road. His lordship next dealt with the question whether the traffic complained of was extraordinary, and he referred to Hill *v.* Thomas (9 *The Times* Law Reports, 647 ; [1893] 2 Q.B. 333), and Etherley Grange Coal Company *v.* Auckland District Highway Board (10 *The Times* Law Reports 62 ; [1894] 1 Q.B. 37), where Lord Esher said that "the ordinary traffic on the particular road must be looked to in order to see whether the traffic is extraordinary, and that it is none the less extraordinary with regard to that road because it would be ordinary traffic on another road." The last case on the subject was Barnsley British Co-operative Society *v.* Worsborough Urban Council (32 *The Times* Law Reports, 41 ; [1916] 1 A.C., 291). In that case Lord Loreburn said : "I can understand cases in which it might be properly thought that it was extraordinary by reason of the purpose, or the occasion, or the quality, or the quantity, or the method of use." Whether particular traffic was extraordinary traffic must be a question of fact in each case. Counsel for defendants said that this was the first case in which it had been sought to make the owners of motor omnibuses liable for extraordinary expenses on the ground that such traffic was extraordinary traffic. His lordship thought that statement did not advance the solution of the problem, which depended on the circumstances in which the omnibuses ran over the road. On some roads, like the Strand, omnibuses were not extraordinary traffic ; on other roads one was just as likely to meet a mastodon as a motor omnibus, and in such case it could not be said that the running of a motor omnibus was ordinary traffic. The defendant's omnibuses were much heavier than any of the traffic on the roads in question before the advent of the motor omnibuses, and a census of the traffic from September 28 to October 4, 1915, showed the vast preponderance of the omnibuses over any other motor traffic of comparable weight along the roads, there being 135 omnibuses, against 11 covered motor vans, eight motor lorries, and two traction engines with trailers. Counsel for defendants said that the question was whether a service of omnibuses run to serve the needs of a district could be extraordinary traffic. His lordship was unable to see how the demand of a district for traffic which was extraordinary could turn that traffic into ordinary traffic, although the traffic might be necessary traffic, and might in the future become ordinary traffic. The only thing, however, which he had to consider was the present traffic over the roads as they were at the present time. He came to the conclusion that the traffic in question was extraordinary traffic, and that the roads had been properly kept up, and that plaintiffs had incurred extraordinary expenses to the amount of £350 in repairing the roads. Defendants, however, said that their liability was limited by section 12 of the Locomotive Act, 1898, to expenses incurred within 12 months from the beginning of the action on July 20, 1915, whereas plaintiffs were claiming for expenses incurred from March 31, 1914. Further, plaintiffs said that some of the damage was due to the cartage of sand over the roads. Taking those facts into consideration, his lordship thought that plaintiffs were entitled to £350, and he gave judgment for that amount.

BRIGHTON OMNIBUS SETTLEMENT.

The Corporation of Brighton, on November 23, arrived at a settlement of the troubles that had been experienced during the past two years in consequence of the desire of two companies to run public passenger motor vehicles in the borough. For many years the Brighton and Hove United Omnibus Company had provided the services, and although Hove Corporation had also granted licences to Thomas Tilling, Limited, the latter company were unable to take up passengers in Brighton owing to the Watch Committee of that town refusing to grant licences for their vehicles. Messrs. Tilling, in January last, appealed to the High Court, but the Lord Chief Justice and his colleagues upheld the action of the Corporation as regards the refusal of omnibus licences, the Court holding that the Council had acted on the advice of the chief constable upon the traffic conditions. In the matter of licences for chars-a-bancs, which the Watch Committee had recommended should be granted, but which the Corporation refused, the Court decided in favour of Messrs. Tilling.

Negotiations that have since taken place resulted in the Brighton and Hove United Omnibus Company applying to the Brighton Council for the renewal of their licences, which expired on December 10. The company also informed the Corporation that arrangements were in progress for the transfer of their rolling stock, premises and

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MOTOR TRAFFIC.

plant to Thomas Tilling, Limited, at the end of the preceding month. The Watch Committee recommended that Thomas Tilling, Limited, be informed that upon the completion of the purchase the Council would transfer to them the other company's licences for 41 petrol motor omnibuses, 12 electric omnibuses, and 8 horse omnibuses, and would agree to the substitution of eight petrol motor omnibuses in place of the eight existing horse omnibuses, subject to the vehicles being approved by the chief constable. The Committee were agreeable to renew the licences for 41 petrol motor omnibuses for a further period of three months, but they were averse to granting Messrs. Tilling's application for 14 additional licences, though willing to allow their petrol omnibuses then running in Brighton and Hove to be substituted for a corresponding number of similar vehicles, subject to the vehicles being passed by the chief constable. With regard to a number of additional routes and services suggested by Messrs. Tilling, the committee counselled that consideration thereof be deferred. Finally the committee resolved "that Thomas Tilling, Limited, be further informed that, while agreeing to the above transfer, the Council reserve all rights and powers vested in the Corporation under the Brighton Corporation Acts, 1903 and 1912, and to be acquired under the Provisional Order now being promoted by them in Parliament to provide and work motor omnibuses or a system of trackless trolleys either themselves or by their lessees."

When the matter came before Brighton Council on November 23, it was discussed in committee. The recommendations of the Watch Committee were confirmed with the exception of the clause relating to the proposed new services. On the latter question the Corporation decided that Messrs. Tilling's proposals should be further considered not later than the meeting of the Corporation to be held on December 21.

PETROL LORRY COSTS.

DETAILS SUBMITTED BY THE BEDFORDSHIRE COUNTY SURVEYOR.

In his annual report for the year ended March 31 last, Mr. F. W. Smart, county surveyor of Bedfordshire, includes the appended schedule of the detail costs of working the three petrol motor lorries owned by the County Council during the year and also for three-quarters of the preceding year. Mr. Smart observes: —"It will be noticed that the cost per hour for petrol lorries has increased by 7d, and the cost per ton-mile by 1d.; the former is accounted for by the general increase in cost of labour and spare parts, which were very difficult to obtain, and then at a greatly increased cost. The cost per ton-mile will always vary, as the ruling factor is the length of the journey, and in consequence of haulage continuously through the winter up to Haynes Park camp for the military authorities being comparatively a short journey, this cost is higher than last year, but approximately the same as the previous year.

"The fourth lorry ordered by the Council in November, 1915, from Commercial Cars, Limited, has not yet been delivered, and I am given to understand that there is no probability of delivery for some time yet. Steam wagons have been hired to a slightly larger extent than previously. Comparing the cost of the Council's lorries with those of the hired ones per hour, the difference appears to be very slight, being only 1d. per hour, but for a true comparison the average tonnage of materials hauled must be taken into consideration, and the following is an analysis on this basis, viz.:— In 1,574 hours the hired lorries conveyed 1,896 tons at an average cost of 3s. 0d. per ton, and during the same number of hours the Council's lorries conveyed 2,907 tons at an average cost of 2s. 6d. per ton."

The total cost of working the Council's lorries was £1,046 9s., while the hired lorries cost £360 15s., and horse cartage £4,364 3s. Practically nothing but tarred-slag macadam has been used for improved surfacing work, and of a total quantity of 10,388 tons laid down during the year, 9,288 tons were manufactured at the depot, the balance being purchased for use in the South District.

Many of the principal roads have been considerably damaged by military and heavy motor traffic, especially the roads around Bedford and the Watling Street, where the heavy traffic is continuous throughout the year. It was necessary in the case of Watling Street to prepare a scheme for reconstruction and the strengthening of the abutments of several sections, as it is most undesirable to re-surface with tarred slag until the strengthening works have been carried out. These works are now in hand, but it will be several years before the full length is completed, as it is only possible with the present conditions of labour to undertake a small section each year.

SCHEDULE showing Detail Costs of Bedfordshire County Council Motor Lorries. Year ended December, 1915.

Number of Lorry.	Working Hours. Loading.	Outward Journeys.	Unloading.	Inward Journeys.	Total.	Mileage Covered.	Number of Loads Carted.	Weight of Loads Carted.	Materials. Petrol.	Motor Engine Oil.	Gear Oil.	Waste.	Cloths.	Common Oil.	Paraffin Oil.	Grease.	Carbide.	Tires.	Total Cost of Labour, Materials, Tires, Sparks Etc.	Depreciation of Capital.	Total.	Cost per Ton-Mile.	Cost per Working Hour.
								Tons. Cwts.	Gals.	Gals	Gals.	Lbs.	Lbs.	Gals.	Gals.	Lbs.	Lbs.		£ s. d.	£ s. d	£ s. d.	d	d.
1	779	642	313	505	2,239	12,678	857	4,283 19	2,236	111	28	4	16	3	2	269	9	—	419 12 6	104 15 9	524 8 3	3·97	56·2
2	809	666	381	560	2,416	12,596	943	4,692 15	2,346	156	40	7	9	4	4	269	15	—	423 5 6	104 15 9	528 1 3	4·04	52·5
3	581	488	302	400	1,771	9,998	579	2,891 16	1,516	95	18	8	4	1	8	203	8	—	299 19 6	104 15 9	404 15 3	3·89	51·8
TOTAL ...	2,169	1,796	996	1,465	6,426	35,272	2,379	11,868 10	6,098	362	86	19	29	8	14	741	32	7	1,142 17 6	314 7 3	1 457 4 9	3·97	54·4
1-Yr. 1914	1,734	1,864	719	1,665	5,982	38,124	2.072	10,548 3	6,528	359	77	15	47	5	21	218	29	9	948 8 7	243 14 0	1,192 2 7	2·93	47·8

MOTOR VEHICLES FOR MUNICIPALITIES.

CHESTER COUNCIL have acquired a 1-ton electric lorry.

DEVONSHIRE COUNTY COUNCIL have decided to purchase a steam tractor.

ISLINGTON COUNCIL have resolved to obtain a motor sweeping machine.

MARGATE COUNCIL have agreed to purchase a motor fire engine out of revenue.

CONSETT COUNCIL are purchasing a motor wagon for the removal of house refuse.

BOURNEMOUTH COUNCIL contemplate obtaining a motor fire engine and a chassis for an escape.

LOCHERBER DISTRICT COMMITTEE have purchased a motor car for the use of the road surveyor.

SALFORD COUNCIL have provided a motor car for the exclusive use of the mayor of that borough.

WALSALL COUNCIL are considering the question of purchasing a 300-gallon steam fire engine.

BRADFORD CITY COUNCIL have advertised for tenders for the supply of mechanically-propelled road sweeping machines.

HALIFAX TRAMWAYS COMMITTEE have ordered a 3-ton motor tower wagon from Halley's Industrial Motors, Limited, Glasgow.

SALFORD COUNCIL have placed an order with Halley's Industrial Motors, Limited, for a 2-ton chassis for the tramways department, and with Fodens, Limited, Sandbach, for a steam wagon fitted with a crane.

BRIGHTON WORKS COMMITTEE have called for a report on the use of motor vehicles for street cleansing and refuse removal. The chairman of the committee is to visit other towns in company with the surveyor, to view such vehicles at work.

LANCASTER CORPORATION have received delivery of two electric omnibuses from Edison Accumulators, Limited, with bodies made by the Brush Electric Manufacturing Company. The vehicles seat 22 passengers, and their speed is 12 miles per hour. Three vehicles have been ordered.

BATTERY VEHICLE FOR BREAKDOWNS, ETC.—The electric lorry and an electric passenger car which Wolverhampton Corporation have agreed to purchase for the tramways department will be used for speedy conveyance to breakdowns, repairs and testing, also for supervision by the management. The surface contact boxes of the Lorian system are tested twice a week by a tramcar coupled to a service car, but the use of a battery vehicle will prevent loss of time and add to efficiency. The same remark is applicable in the case of a breakdown.

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MOTOR TRAFFIC.

WOMEN IN MOTOR WORKS.

The necessity of sending every available man to the forces has led to a reduction of male labour even in the workshops of motor vehicle manufacturers whose products are requisitioned by the Admiralty and the War Office. The extent to which women have been trained to fill the vacancies is a matter of which very little has been written for public perusal. That the substitution has been very largely and successfully arranged is evident from what has been done by the Albion Motor Car Company, Limited, of Glasgow. This company's output of vehicles has of necessity been larger during the past two years than at any period in its history, and towards this achievement female labour has contributed to no small extent during the present year. These operatives are to be found

in four departments, a photograph of one of which is given on this page. One of the departments in question is the gauging and typing, where the women attend to the typing of parts. In the drilling shop they work the lighter multi-spindle drills, and they are responsible for the carrying out of the external grinding in the department shown in our illustration. They also work medium sized milling machines in another shop.

INDIAN MOTOR VEHICLE IMPORTS.

The present prosperity of India is clearly indicated by the enormous increase of imports in motor vehicles, mostly light ones for private use, and of tires. There is evidently (says the writer of the Indian notes in the *Contract Journal*) no war-saving campaign in the land nor restriction in the use of motor spirit—while cars, tires, and spirit are so urgently wanted for purposes of war by England and her Allies. The purchase of motor cars in April, May, and June last amounted to £232,989, or over £91,000 more than in 1914. If the same rate of increase continues during the remainder of the fiscal year, the figures will exceed those of 1915–16 by £160,000, and show a total of nearly a million sterling for 1916–17. In the first three months of the financial year the number of cars imported were 1,154 as against 554 in 1915 and 506 in 1914; while the values of tires were £65,195 and of tubes £19,137, as against £30,325 and £9,718 respectively in 1914. The United States handled in the same months nine-tenths in number and eight-tenths in price of these. Great Britain still controls three-quarters of the business in parts of cars, motor cycles, and accessories.

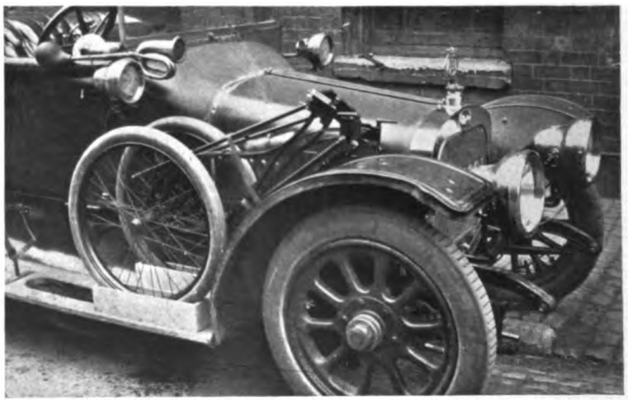
PNEUMATIC TIRED STRETCHER CARRIER.

The truth of the old adage "necessity is the mother of invention" has never been more clearly demonstrated than during the past two years of war. Thus we have seen the almost impossible achieved on land, on sea, under the sea, and in the air. New guns, new explosives, and new equipment of all kinds have been evolved, while the development of mechanical traction has amazed even those who have understood its possibilities. In life-saving appliances the inventive ingenuity of our engineers has been equally active,

A Pneumatic Stretcher Carrier.

and we have from time to time published illustrated descriptions of motor ambulances, which both for capacity and comfort leave little to be desired. One of the latest machines designed to expedite the removal of the wounded is a stretcher carrier which is manufactured by Messrs. Alfred Wiseman and Company, of Birmingham, who are well known in the tramway field.

As will be seen from the illustrations, the appliance is simple and compact. The special feature in its design, however, which has so commended itself to the War Office authorities, and has made it so popular with the ambulance men in the field, is the rapidity with which it can be taken from its collapsed position, as shown on the step of the motor car in Fig. 2 and set up for use. The secret of this quick action is to be found in the fact that no section is taken



The Carrier Folded and Carried on the Mud Guard of a Motor Car.

apart, all movable members are held in position by thumb screws, which, being released, permits of the carrier being closed to the collapsible position.

The illustration in Fig. 1 shows the carrier complete with its stretcher in position. It will be seen that iron legs support each corner; these are attached by means of a shackle joint to the end of the springs which form the actual supports for the stretcher. Clips are provided at each corner which hold the stretcher securely on the carrier. In this position so firm is the structure that minor operations can be performed, while complete dressings can be applied with the greatest ease and comfort both for the patient and staff. The legs are securely held by means of the thumb screws;

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when these are released the legs can be raised and placed into a catch attached to the spring when the carrier with its patient is ready for removal. To close the carrier so that it may be fitted on the steps of a motor car, the spring arms are folded over and the axle, which is built upon the trellis-work principle, and is held in position by a thumb screw, is then made to collapse by merely pressing the two wheels together. The wheels, which are of the ordinary wire type, have stout pneumatic tires of good section. The whole equipment only weighs 80 lbs. and two men can easily lift the carrier and patient over the worst of the ruts and holes.

MOTOR AND TIRE COMPANIES.

The Daimler Company.

Sir Hallewell Rogers, who presided at the annual general meeting of the Birmingham Small Arms Company, in which the Daimler Company, Limited, Coventry, is included, moved the confirmation of the following dividends:—On the "A" preference shares at the rate of 5 per cent. per annum, less income tax, for the six months ended July 31; on the "B" preference shares at the rate of 6 per cent. per annum, less income tax, for the six months ended July 31; on the ordinary shares a further interim dividend of 15 per cent., free of income tax, in addition to the interim dividend of 5 per cent. paid in April last. The chairman gave an outline of the great work upon which the company are engaged, including rifles, Lewis machine guns, cycles, motor cycles, etc. The Daimler Company had manufactured motor engines, cars, military transport and commercial vehicles. Letters had been received testifying to the extraordinary efficiency of the company's machines at the front under most trying circumstances. The chairman added:—"The shareholders will be interested in learning that the Daimler Company, which is owned by us, has, in its particular direction, effected great service to the country. It has utilised the capacity of its greatly extended works, and the brains of its organisation, in largely increasing its output. Most of you as business men will be acquainted with the big industrial association, in the inauguration of which Mr. F. Dudley Docker, C.B., has taken a large part, and which is to be known as the Federation of British Industries. Believing as they do that this federation will be able to wield an enormous influence to the advantage of British trade, your directors have decided that the company shall join this federation, and your deputy-chairman, Mr. E. Manville, has been appointed on the executive council." Mr. Edward Manville, in seconding the resolution, drew attention to what the chairman had said in regard to the Daimler Company.

Dennis Brothers (1913), Limited.

Mr. Nicholas P. Andrew, who presided on November 23 at the annual general meeting of Dennis Brothers (1913), Limited, motor vehicle and fire engine manufacturers, of Guildford, remarked that at the last general meeting he pointed out that a serious inroad had been made into the company's private connection and goodwill through the unavoidable action of the War Department in having commandeered their whole output, and having thus compelled buyers of commercial vehicles to send their orders either abroad or else to firms in this country who had hitherto built nothing that seriously competed with the company's product. Just at that period, however, the War Department released a portion of their output for sale to firms employed on Government work—a privilege which was greatly appreciated by the directors. But the privilege was quickly withdrawn. Apparently the War Office requirements increased, and the company's product was too good to be dispensed with. Then followed a period when they were buoyed up with the hope that by prohibition of imports of foreign vehicles the foreigner would not be able to build up a connection to their detriment. In this they were so far disappointed; importation continued. This matter of goodwill was of importance to the company, because in normal times it was the foundation of their profit-earning capacity, and moreover it stood as a considerable asset in the balance sheet. When the excess profits tax was introduced they hoped the depreciation of the goodwill would be allowed for, but that had not been done. For the year ended September, 1914, they had been allowed to retain 50 per cent. of the excess profits, for 1915 40 per cent., and for the year now closed they were to retain their pre-war standard, plus 20 per cent. increase and such allowances as they might be entitled to. They hoped to receive fair and liberal treatment, especially in view of the thorough manner in which the company had succeeded in increasing its deliveries. The Government were sometimes accused of lavishness, but they did not experience it; but, on the contrary, found the Government a keen buyer. Dealing with the accounts, he stated that the net profit amounted to £120,186, after deduction of £28,333 for general depreciation and writing off. They had been able to acquire extra land adjoining their factory site at an economical price. The board had thought it prudent to allocate to general reserve account £70,000 as a further reserve against goodwill and as provision for an unascertained liability in in the form of special taxation. Therefore, temporarily, the reserve stood at £120,000. The directors recommended the payment of a final dividend of 1s. per share, making 10 per cent. for the year, and a bonus of 1s. per share, thus bringing up the total distribution to 15 per cent. The satisfactory results now reported were chiefly due to the unremitting attention which the managing directors gave to their duties. (Applause.)

Mr. H. R. Dennis seconded. He remarked that during the past 12 months the demand of the War Office for the company's production had not abated. The directors were able to show a slightly improved result for the past year without raising prices to the Government, who were paying for military wagons the same price to-day as at the outbreak of war. At the outbreak of war the goodwill was a very valuable asset and was supported by a large number of orders on hand, but unfortunately, through working for the Government, they had been prevented from maintaining it, and he feared it was passing into the control of foreigners. For this reason, the position after the war would be a very difficult one unless the Government were fully awakened to the situation. It appeared urgently necessary that the Empire as a whole should assist their industry by imposing adequate import duties upon foreign vehicles. (Hear, hear.) If British manufacturers were not enabled to extend their markets and output, a serious degree of industrial disorganisation was inevitable. The company's premier position as fire engine manufacturers had been fully maintained, and in the orders placed in this country and in the countries of our Allies this company had figured more prominently than any other maker.

John I. Thornycroft and Company, Limited.

The directors recommend a dividend of 10 per cent. on the ordinary shares for the past year. In their report they state that the business was more than three times the pre-war average. The distribution for 1914-15 was similar to that now announced, for 1913-14, 8 per cent., for 1912-13, 2½ per cent., and for 1911-12, 5 per cent.

Dunlop Rubber Company.—The directors announce a further dividend of 10 per cent. on ordinary shares, making 15 per cent. for the year ended August 31. The dividends for each of the three previous years were similar to those proposed for the past year, while 12½ per cent. was paid on ordinary shares for 1911-12. Creation of 1,000,000 B preference shares of £1 each, entitled to a fixed cumulative dividend of 6½ per cent., is recommended by the Board.

Increase of Capital of the Dunlop Rubber Company.—At a meeting of the Dunlop Rubber Company on November 7, the shareholders approved of a resolution to increase the capital to £3,000,000 by the issue of £1,000,000. Sir Arthur du Cros, who presided, and moved the resolution, stated that the money was required to increase the company's stocks of raw materials and manufactured goods to the value of about £750,000, also to provide additional capital to finance the manufacture and sale of solid tires. In the United States the demand for solid tires had doubled within two years, and had reached a total of 1½ million tires. In Europe there were more solid tire transport vehicles in use than in the United States, and the enormous number of vehicles brought into commission would exist after the war, and would be used to supplement railways and would be invaluable in countries not fully developed. The Dunlop Company's output of solid tires had increased 4½ times in four years, and when their new mill was completed they would be able to increase their trade by 15 times. He might mention that in one year alone, taking the returns from leading users, such as the London General Omnibus Company and so forth, the average increase in the efficiency of the company's solid tires had been 45 per cent. That increase in efficiency was the result of ceaseless watchfulness in their laboratories, where last year, even with their greatly depleted staff, they had carried out 73,000 distinct and separate tests all tending to improve the efficiency of their output. German competition had been eliminated, but that had been replaced by American competition. The Government, with a view of restricting the import of goods which could be produced in this country, and so avoiding the export of gold, first imposed heavy import duties; later they abandoned that method in favour of total prohibition, but in connection with rubber goods the prohibition had been withdrawn. He considered the object of the Government in that withdrawal could have been achieved without sacrificing the interests of the industry. Their business in France had completely recovered itself, and stood higher than ever before.

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MOTOR TRAFFIC.

MOTOR TRAFFIC NOTES.

NUMBER OF PETROL LICENCES.—During the three months ended September 30, 292,250 licences to consume petrol were issued by the Petrol Control Board.

OMNIBUSES AT PERTH.—It is recorded of the motor omnibuses run in connection with Perth Corporation Tramways that the vehicles have done remarkably well as feeders of the tramways.

MOTOR SPIRIT FOR SHEFFIELD OMNIBUSES.—Sheffield Corporation Tramways Committee have placed a contract with Messrs. Meade-King, Robinson and Company for the supply of motor spirit for the omnibus department.

SAN FRANCISCO OMNIBUSES.—The city engineer has suggested to the Board of Supervisors that a motor omnibus service should be instituted from the Potrero Avenue terminus of the San Francisco Municipal Railway to Hunters Point, which is three miles distant.

DRAKE AND GORHAM ELECTRIC VEHICLES.—At the annual meeting of Messrs. Drake and Gorham, at 66, Victoria Street, S.W., on November 8, Mr. B. M. Drake (chairman) stated that the battery vehicle department had been able to demonstrate on an extended scale the economy and convenience that could be obtained from electric haulage.

MOTOR FUEL FROM NATAL MOLASSES.—The production of motor fuel from molasses has been considerably advanced of late in Natal. The assets of the original company, says the High Commissioner for the Union of South Africa, have been taken over by a new company, who, as soon as certain Excise difficulties are removed, are prepared to proceed on a big scale with the manufacture of alcohol.

LAFFLY SWEEPERS UNOBTAINABLE.—Marylebone Council have been unable to secure delivery of the third Laffly motor road sweeper, which was ordered in December, 1915, the French Government having requisitioned all the machines at the company's works and forbidden the manufacture or export of any more. As the export of spare parts is also prohibited, the Council are endeavouring to get them made in this country.

QUEUE FOR BIRMINGHAM OMNIBUS PASSENGERS.—In consequence of complaints that passengers on motor omnibuses arriving at New Street terminus were permitted to obtain a penny ticket in order to secure seats for the outward journey, the Watch Committee have ordered the management not to permit the practice. Passengers coming to town to travel out again are now to alight and take up position at the end of the queue.

ROAD MATERIAL DELIVERED ON TRAMWAYS.—The Ohio Electric Railway, Springfield, Ohio, is doing a considerable business in delivering crushed stone for roads and other purposes from quarries located on the company's lines and from connecting steam railroads. The convenience of deliveries made in this manner has proved very great. The stone is loaded into side dump cars, flat-bottom gondola cars, and hopper-bottom gondola cars.

MOTOR VEHICLE WORKS FOR CORK.—Trafford Engineering Company, Manchester, have agreed to purchase for £10,000 Cork Park racecourse and some ground abutting on the quays for the purpose of erecting a motor factory, with the stipulation that £200,000 should be expended on buildings thereon and a guarantee to employ 2,000 persons on the completion of the work. The vendors of the land were Cork Corporation and the local Harbour Commissioners.

TIRES NOT AFFECTED BY THE MOTOR CAR ORDER.—The Dunlop Rubber Company, Limited, state that a misapprehension seems to have arisen in regard to the latest order forbidding the manufacture of motor cars or parts, and the execution of repairs thereto, without a permit from the Admiralty, the Army Council, or the Ministry of Munitions. In some people's minds motor tires appear to be included in the order; but this is not the case. Neither the manufacture of Dunlop tires nor their distribution to the public is affected.

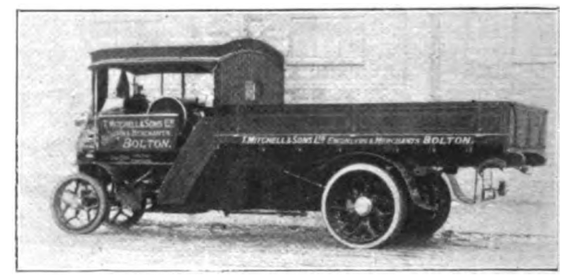
ADVERTISING AGAINST JITNEY DANGERS.—The Dallas (Tex.) street railways are seizing on opportune themes for their advertisements in their campaign for business against the jitneys. An advertisement in the daily newspapers during the Texas State Fair at Dallas, addressed to "Fair Visitors," said, "Why take chances of being robbed or assaulted by thugs or bandits? Ride the street cars. The safe way." The appeal was based on the fact that there had been numerous robberies and holdups by persons pretending to operate jitneys.

IMPORTANT DECISION AFFECTING HEAVY MOTOR CARS.—The Commercial Motor Users' Association have won an important appeal on behalf of users of heavy motor cars. A member was convicted at Birkenhead for causing a 4-ton Sentinel steam wagon to stand on a bridge contrary to the by-laws of Chester County Council. Although evidence was produced to show that the vehicle was registered as a heavy motor car, the magistrates held that it was a locomotive within the meaning of the Act, and imposed a fine. The appeal was heard in the Divisional Court before the Lord Chief Justice, Mr. Justice Ridley, and Mr. Justice Low, when the appeal was allowed with costs.

POSTHUMOUS AWARD TO AN OMNIBUS DRIVER.—The Commercial Motor Users' Association have made a posthumous award of their merit badge—which was instituted in 1911 for acts of distinction in connection with public service and commercial motor vehicles—to the late driver Thomas Jones, who lost his life in a successful attempt to avert a serious disaster in North Wales. His omnibus began to run backwards down a steep hill at Carnarvon. Jones successfully steered a zigzag course backwards down the hill for 300 yards, when, seeing that a collision with a wall at the bottom was inevitable, he threw some children who were sitting beside him clear of the vehicle, but was himself pinned underneath when it overturned, and was the only one killed. The badge and a cheque for five guineas have been forwarded to his widow.

CHARS-A-BANCS AND PETROL: ENGINE HEATING ALLOWED.—The Rapid Motor Transport Company, Limited, of Glasgow, one of the members of the Commercial Motor Users' Association, were summoned, under the Defence of the Realm Act, for using petrol for the purpose of heating the engine of a chars-a-banc. Evidence was produced to show that although petrol was used to heat the engine prior to the commencement of the run, the actual run was made on paraffin. The Procurator Fiscal contended that this came under the Prohibition Order, but the Sheriff held a contrary view and acquitted the accused. The Procurator Fiscal appealed against the decision, and the association took steps to support their members, the case being down for hearing before the Justiciary Court at an early date, but the Procurator Fiscal has now intimated that the appeal will not be proceeded with. The association have been advised that the appeal would not have been withdrawn except on the instructions of Crown Counsel, and the result, therefore, is an authoritative decision that petrol may be used for heating paraffin engines on chars-a-bancs.

SPENCER-MOULTON SOLID TIRES.—A series of photographs appears among our advertising pages showing various makes of wagons fitted with Spencer-Moulton solid rubber tires. The collection shows these well-known peripheries on various phases of duty, including war and ordinary industrial work; and the photographs further indicate that Spencer-Moulton tires are in favour in widespread parts of the kingdom. A number of tramway and railway companies, like the War Office and Crown Agents



for the Colonies, and many private owners, are patrons of what have become known as "the superb mileage tires." During the last few days the senders of renewal orders have included users of the Foden steam vehicle shown in the accompanying photograph. The machine is in use in a part of England where the roads are not the choicest in the land.

LONDON STREET TRAFFIC CASUALTIES.

The Home Secretary on November 21 presented to the House of Commons the following return showing the number of deaths, the number of persons injured, and the number of accidents known to the police to have been caused by tramway cars, motor omnibuses, and other motor vehicles in the Metropolitan Police district in the years 1914 and 1915 and till the end of October in the present year:—

	No. of persons killed by			No. of persons injured by		
Year.	Tramway cars.	Motor Omnibuses.	Other Motor Vehicles.	Tramway cars.	Motor Omnibuses.	Other Motor Vehicles.
1914	37	148	308	3,171	3,007	8,460
1915	86	154	426	4,001	2,572	9,793
1916 to Oct. 31 ...	63	135	311	3,085	1,810	6,937

In the three years referred to, the number of accidents caused to tramway cars was 5,254, 6,142, and 4,594 respectively; by motor omnibuses, 6,521, 4,981, and 3,394; and by other motor vehicles, 20,156, 21,913, and 15,988.

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THE

Tramway & Railway World

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Including sixty-four issues, of which twelve are large illustrated numbers, printed on fine art paper.

NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

WEEKLY LIST OF TENDERS INVITED.

THE GREAT INDIAN PENINSULA RAILWAY COMPANY.

STORES.

The Directors are prepared to receive tenders for the supply of the following stores, namely:—

Cast-iron tank plates, etc.
Railway tickets, etc.
Leather belting, etc.
Galvanised water-cans and mortar-pans, cloths, etc.

Specifications and forms of tender may be obtained at this office on payment of the fee for the specification, which payment will not be returned.

Tenders must be delivered in separate envelopes, sealed and addressed to the undersigned, marked "Tender for Cast Iron Tank Plates, etc.," or as the case may be, not later than 11 o'clock a.m. on Thursday, December 14, 1916.

The Directors do not bind themselves to accept the lowest or any tender.

R. H. WALPOLE,
Secretary.

Company's Offices,
48, Copthall Avenue, London, E.C.
December 6, 1916.

COUNTY BOROUGH OF WARRINGTON.

ELECTRICITY DEPARTMENT.

The Electricity and Tramways Committee of the County Borough of Warrington invite tenders for twelve months' supply of earthenware conduit.

Specification and form of Tender can be obtained from the undersigned on payment of one guinea, which will be returned on receipt of a bona fide tender. Five shillings will be charged for extra copies of the specification.

Tenders, addressed to the "Chairman of the Electricity and Tramways Committee, Town Hall, Warrington," must be sealed with wax, and endorsed "Tender for Earthenware Conduit," and delivered not later than 12 o'clock noon on Tuesday, December 12, 1916. The lowest or any tender will not necessarily be accepted.

F. V. L. MATHIAS,
Borough Electrical and Tramways Engineer.

Howley, Warrington.

CITY OF SHEFFIELD—TRAMWAYS AND MOTORS DEPARTMENT.

TRACTION MOTORS.

The Tramways and Motors Committee are prepared to receive tenders for the manufacture, supply and delivery of fifty traction motors.

Particulars and forms of tender, together with conditions of contract, may be obtained on application to

THE GENERAL MANAGER,
Tramways and Motors Department,
Division Street, Sheffield.

LONDON COUNTY COUNCIL.

The London County Council invites tenders for the supply of 325 tons of rolled steel bar for magnetic brake shoes. The form of tender may be obtained from the chief officer, London County Council Tramways, 62, Finsbury Pavement, E.C. No tender received at the County Hall after 1 p.m. on Tuesday, December 19, 1916, will be considered. The Council does not bind itself to accept any tender.

JAMES BIRD,
Clerk of the London County Council.

POSITIONS VACANT.

CITY OF BIRMINGHAM ELECTRIC SUPPLY DEPARTMENT.

BOILER HOUSE SHIFT ENGINEER.

Applications are invited for the position of Shift Engineer to take charge of the running of the boiler house at the Summer Lane generating station.

Applicants must have had a sound mechanical and engineering training, and must have had previous charge of fairly large installations of high-pressure steam boilers fed with mechanical stokers.

The salary offered is £150 per annum, plus £10 extra per annum during the war.

Applications (made on forms which can be obtained from the Secretary of the Electric Supply Department), accompanied by not more than three testimonials as to experience, ability, and character, must reach the undersigned not later than Wednesday, December 13, 1916.

R. A. CHATTOCK,
Electric Supply Department, City Electrical Engineer.
14, Dale End, Birmingham.
November 28, 1916.

PONTYPRIDD URBAN DISTRICT COUNCIL.

APPOINTMENT OF TRAMWAYS TRAFFIC SUPERINTENDENT.

The above Council invite applications for the position of Traffic Superintendent.

Applications will only be considered from persons who have had experience in the traffic department of electrical tramways.

Commencing salary £150 per annum, rising by annual increments of £5 to £200.

Applications must be made upon forms to be obtained from the Engineer and Manager, Generating Station, Treforest, Pontypridd, and must be sent to the Chairman of the Tramways Committee, Municipal Buildings, Pontypridd, on or before Saturday, December 16, 1916.

Municipal Buildings, Pontypridd. J. COLENSO JONES,
December 5, 1916. Clerk to the Council.

THE BIRKDALE DISTRICT ELECTRIC SUPPLY COMPANY, LIMITED.

SWITCHBOARD ATTENDANTS.

Wanted immediately, two Switchboard Attendants; wages 32s. 6d. per week. Must be ineligible for military service. Apply, with full particulars of age, training and experience, to—

MANAGING ENGINEER.

Electricity Works, Birkdale, Southport.

ASSISTANT ENGINEER.

Wanted, Assistant Engineer to take charge of car sheds, permanent way, and overhead equipment of tramways.

Only those with previous experience and not eligible for military service need apply.

State wages required, and when free, to the Manager, Sunderland District Tramways, Fence Houses, Co. Durham.

SHIFT ENGINEER.

Shift engineer, ineligible, required for power station near Glasgow. Wages 40s. per week of seven eight-hour shifts.—Apply, stating age and experience, to LANARKSHIRE TRAMWAYS COMPANY, Motherwell.

In the Matter of Trading with the Enemy Act, 1916.
THE A.E.G. ELECTRIC COMPANY, LIMITED.

CLEARANCE SALE OF STOCK, IN ONE LOT, OF ELECTRICAL ACCESSORIES BY PUBLIC TENDER.

By Order of the Controller, Mr. Maurice Jenks, F.C.A. (Messrs. Maurice Jenks, Percival & Co.), the entire stock of Motors, Instruments, Fittings and Electrical Accessories will be sold by public tender, in one lot.

The goods are on view upon the premises, Richmond Mews, Richmond Buildings, Dean Street, Soho, London, W., and may be inspected upon production of Catalogue, to be obtained gratis from the Selling Agents for the Controller, Wheatley Kirk, Price and Co., 46, Watling Street, London, E.C.

Tenders must be delivered to the Selling Agents on or before noon, Friday, December 15, 1916.

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HARD WEAR RESISTING.
GOOD BRAKING EFFECT.
GUARANTEED CHEAPEST PER CAR MILE.

Sole Manufacturers:
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SKINNERBURN ROAD,
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160, WOODHOUSE LANE, LEEDS.
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Telephone: 3488 Leeds. MATERIAL AND SUPPLIES.

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IN RELATION TO
LOCAL AUTHORITIES,
BY
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WILLIAM WHITTINGHAM,
City Treasurer's Office, Bradford.

This work deals exhaustively with the assessment to Income Tax and Excess Profits Duty of the Trading Undertakings of Local Authorities. Specimen Returns are set out, shewing the application of the Rules and Schemes agreed with the Inland Revenue Department, and the methods of arriving at the "set-off" against the Rating Fund Interest.

WILLIAM BYLES & SONS, Ltd., Publishers, BRADFORD

Electric Tramcar Handbook
FOR
MOTORMEN, INSPECTORS,
AND DEPÔT WORKERS.
By W. A. AGNEW.
120 Pages, 7 in. by 4½ in. Cloth. Price, ***1s. 6d.*** Postage, ***2d.***
Copies can be obtained from "The Tramway and Railway World" Offices, Amberley House, Norfolk Street, W.C.

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OUR RATTAN

(NATURAL, GLAZE, DULL FINISH, OR COLOURED)
in twill, straight, or fancy weaves, canvas backed or unbacked, is
BRITISH MADE THROUGHOUT
from the splitting of the cane to the finished article.
We hold **LARGE STOCKS OF RAW MATERIALS** and can
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THE
Tramway AND Railway World.

Established in 1892 and Published by
THE TRAMWAY & RAILWAY WORLD PUBLISHING CO., Ltd.,
AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.

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FOR ALL PLACES ABROAD—Thirty Shillings per Annum.

SATURDAY, DECEMBER 9, 1916.

THE SELECTION OF MOTORMEN.

Now that every tramway undertaking has to face the loss of further motormen for military service, while, with the exception of the valuable part-time volunteers, no substitutes can be obtained to fill the vacancies, managers may consider any reference to the subject to be merely tantalising. No discussion of the matter can, indeed, assist the hard-pressed manager at the present juncture, but an investigation recently carried out at Harvard University is of importance in view of the vacancies upon the front platform that will have to be filled after the war. If the method hereafter described could be brought into operation in this country there would seem to be a possibility of avoiding the training of men who, while they may pass through their training satisfactorily, ought not to be placed in charge of a car. The question has arisen from psychological investigations by Professor Munsterberg, at the Harvard Psychological Laboratory, into complaints made by American street railway companies of the heavy expense in which they are involved by motormen's accidents. The Professor devised an experiment in selecting motormen for the Boston cars which had for its object an attempt to discover in the trainee, ability to keep attention constant, to resist distractions by chance happenings in the street, and especially the always-needed ability to foresee the possible movements of pedestrians and vehicles. The result of the investigation, as described by a correspondent of the *Westminster Gazette*, seems to show that some motormen never have accidents, because they feel beforehand what a confused pedestrian or the unskilled chauffeur will do. Others have frequent accidents through failing to foresee how matters will develop. They are not personally blameable. They lack instinctive foresight. The accidents had cost some of the American street railway companies 13 per cent. of their profits. The object of the experiment was to test the men's perception of pedestrians, carriages and automobiles, with reference to their rapidity and direction, in the quickly changing panorama of the street—figures coming from right and left across the track, and those embedded in the stream of men and vehicles which moves parallel to the track. The Professor took a card 13 inches long by 4½ inches wide and drew two heavy lines, half an inch apart, lengthways through the centre to represent a tramway track in the street, leaving a space of four half-inches on either side of the lines. The whole card was marked off into half-inch squares. On either side of the track the squares were filled in an irregular way with black and red figures, 1, 2, 3, one figure in each square. The 1 represented a pedestrian who moved one step—that is, from one square to the next—in a given time. The digit 2 represented a horse-vehicle which moved twice as fast, and the digit 3 an automobile which moved three times as fast—that is, three squares in the same time. The black digits stood for men, horses and motors, which moved parallel to the track, and did not involve danger to the tram-driver. The red digits were the dangerous ones. They moved from either side towards the track. The man under test had to find as quickly as possible those points on the track threatened by the red figure, that is, those squares on the track at which the red figures would land. A red figure 3 four steps from the track was to be disregarded. It would not reach the track. A red digit 3 which was one or two steps from the track could also be disregarded, because it would cross beyond the track. But a red figure 3 three squares from the track, a red 2 steps from the track, and a red 1 one step from the track, would land on the track itself, and the aim was quickly to find these points. It was a good test, as the black figures diverted attention and the red figures too near or too far were easily confused with those which were just at the dangerous distance. Twelve of these cards were passed before the motorman, one after the other, exposed through an opening in a curtain, so that he could see only 5 squares of the length of the card as it moved along, and, of course, the whole 9 squares of the width. The results recorded the number of seconds for passing the whole twelve cards before the motorman, the omissions to record danger where a red figure would have landed on the track, and the errors in recording danger where no danger existed. No trial was started until the man to be tested understood thoroughly the *modus operandi*. Trained motormen reported that they passed through the experiment with the feeling they experience on their cars. The complex situation, with its demands on attention, imagination and quick adjustment, soon brought them into an attitude which they felt was identical with practical work. With experienced motormen the correspondence between the results of the tests and efficiency in ordinary work was satisfactory. Professor Munsterberg urges the importance of continuing the tests at various places according to various schemes, in order to come nearer to the solution of a problem that is economically important to the public and to employers.

NEW GENERATING STATION FOR BELFAST.

On the recommendation of the Tramways and Electricity Committee, Belfast Corporation have decided, pending the extension of the generating station, to decline further applications for the supply of electricity except the applicants are prepared to take it at the time switch rate. The council have also resolved to see if the site already agreed upon for a proposed new system is still available, and to ask Sir John Snell to advise them as to what modifications, if any, he would suggest being made in his report of August, 1914, on the question of the extension of the electricity undertaking. Councillor McCaughey, chairman of the committee, said the council made a mistake in listening to the deputation that asked them to stay their hand a few years ago.

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BIRMINGHAM TRAMWAY DIFFICULTY.

AN INQUIRY TO BE INSTITUTED.

At a meeting of Birmingham City Council on December 5, Councillor Cambridge rose to move a resolution for the appointment of a special committee "to inquire and report to the Council on the failure of the Electrical Department to supply sufficient current for the needs of the city." On a point of order—notice not having been given—the Lord Mayor vetoed the motion, but a substitute proposition, "that the Electric Supply Committee be asked to furnish the Council with a summary of the advice which the engineer has given them since January 1, 1911, on the probable necessity for increasing the generating power at the stations and of their action thereon," was adopted after a lengthy discussion.

Councillor James remarked that before the debate initiated at the Council meeting some months ago by Mr. Harrison Barrow, Chairman of the Tramways Committee, he was inclined to think that the inconvenience was inevitable, although cities such as Sheffield had faced similar difficulties and met them quite satisfactorily, but his confidence was shaken when a day or two later another excuse to the one put forward at the meeting was given the coal supply and something like a storm on the canal.

Councillor Harrison Barrow asked Alderman Jephcott, Chairman of the Electric Supply Committee, what guarantee he could give as to the running of the cars up to 9.30 in the morning, from 12.30 to 2.30 in the afternoon, and after 5 p.m. That was the least the Tramway Committee thought the Supply Committee should arrange for, though, of course, they wanted them to run during the other hours. He could see no reason why in some cases even munition works should not be cut off to allow the cars to be run at the times mentioned. He would like to mention to the Council the extremely serious losses upon the Tramway department in consequence of the vagaries of the Supply department, and especially the members of the Finance Committee, because it was well that they should realise that it was possible the Committee might not be able to hand over anything to the relief of the rates. He estimated that the loss in consequence of the stoppages, allowing since October 14, the same percentage of increase as they had been having during the whole of this year, amounted to about £26,000. There had been no saving whatever in expenditure; in fact, in many cases it had actually increased. For instance, on November 27, the current went off at eight o'clock in the morning, and the result was that the cleaners had nothing to do, and the motormen and conductors, who would have been relieved, were kept in the streets, and had to be paid overtime. The loss to the department was considerably more than the actual loss in revenue. In three separate weeks the loss had gone from £2,500 to £4,600 and £3,600. Thousands of people had taken season tickets on the railway and given the tramways up, and they would not get them back until those tickets had run out.

Alderman Jephcott, in reply, said that, barring accidents, they believed they would be able to run the cars until 9.30 a.m., and from 12.30 to 2.30, but as regarded from 5 p.m. to 6 p.m., until they got the new generating set he could give no definite promise. They would, however, be able to run from, say, a quarter to six. They expected the new set at the end of next week. The repairs at Summer Lane would take about ten days, and they were making arrangements so that there should be no serious effect on the running of the cars. They had been up against the Government in respect to the demand for munitions, and had not been able to meet the demand for trams because they had not got the machinery for the supply at the time they were led to expect it. Had the Committee gone to the Council before the war commenced, with a suggestion for a rapid development of the electric supply, they would have been laughed out of court. Since they understood the Government's great demands for current, they had increased their output within the past two years from 80 million units to nearly 160 million units. In the temporary station at Nechells they had made provision that would make it within two years as large a station as even Summer Lane itself was designed to be. When they got their new 6,000 kilowatt plant in, they would have had 18,000 kilowatts installed within eighteen months, so that it could not be said they had been dilatory in regard to provision for war purposes.

APPLICATIONS BY EMPLOYEES.

Women conductors who have been in the service of Newcastle Tramways Committee for 12 months are to receive a bonus of 2s. 6d. per week.

Keighley employees have asked the Tramways Committee to grant an increase of wages, previous applications having been refused on the ground that the revenue would not admit of increases. As the higher fares are producing additional revenue, the men ask for an extra penny per hour.

A meeting of the sub-committee appointed by Bradford Tramways Committee to negotiate with the men's representatives in reference to the application for increased wages and a revision of the working conditions took place on December 4, but the proceedings were adjourned without a decision having been reached.

With the aid of the rolling stock section conciliation board of the London County Council Tramways a settlement of the applications for increased wages from advertisement labourers and yard and shop cleaners of the tramway department has been arrived at. The rate of pay is to be increased to 27s. a week and the men are to continue to receive the present war bonus of 3s. a week. All time worked in excess of 54 hours a week is to be paid for at the rate of time and a quarter; no man is to be required to stand off for any time owing to his being called upon to work on another occasion in excess of his normal hours. Conduit cleaners, gangers and assistant gangers of conduit cleaners employed on the northern section having asked for an increase of 1d. an hour in their rate of pay, the application, at the recommendation of the Highways Committee, has been referred to the Conciliation Board. The drain men in the building section of the tramways department have asked that their rate of pay shall be increased by 1d. an hour, and certain men employed in the permanent way section have asked for additional war wages of 4s. a week. These applications and others have been referred to the appropriate conciliation board.

Leyton Tramways Committee recently presented a recommendation to the Urban Council that the London County Council scale of pay be adopted for motormen and conductors, and that motormen and male conductors should receive a war bonus of 6d. a day. The bonus, the committee advised, should not be paid to those on active service and women conductors. The cost of the extra pay and the bonus would amount to £1,100 per annum. Councillor F. M. Reed (chairman of the committee), in moving the adoption of the report, stated that the committee's hands were forced by the condition of things. It could not be said that the war bonus met the increased cost of living. Other inter-running authorities had recognised that something more must be paid, and Leyton men were in a worse position with regard to war allowances than those under other authorities. The reason why they did not include the women conductors was that a large number were single, and assumed to be without the responsibilities that married men had. An amendment to delete the clause excluding the men on active service and the women from receiving the bonus was lost by 17 votes to 5, but the council adopted by 14 votes to 8 an amendment by Councillor Heather extending the bonus to the employees with the forces, although Councillor Reed stated that the additional cost would amount to £700 per annum.

TELEPHONIC HORN FOR CARS.

Thanks to the resourcefulness and ingenuity of one of his assistants (Mr. W. L. Box), the general manager and engineer-in-chief of the Liverpool Overhead Railway Company (Mr. E. J. Neachell) has solved the problem of letting passengers on the company's Seaforth and Great Crosby Tramways know where they are in the blackness of the prevailing dark nights. The idea by which the passengers are informed of the principal stopping stations consists of the application of the megaphone or telephonic horn. The apparatus is represented by a mouthpiece attached to the driver's dash stanchion, and connected by a solid tube to a horn fixed on the ceiling of the inside of the car. Drivers are instructed to call out through the tube the name of the principal stopping stations as they are approached. The advantage to passengers is obvious, since it is quite impossible for people to know their whereabouts when blinds are drawn, windows painted, and streets void of light; and it often happens the conductor is too busy to call out all the stations. In practice the device has been found to work admirably, the "Liverpool Post and Mercury" states, and the public are loud in their praises of its efficiency.

DISTRICT RAILWAYMEN AND THE WOUNDED.

Being in enjoyment of what, is probably the most extensive example of welfare work in the whole of the Metropolis, it is not surprising to find that the employees of the District Electric Railway are alive to the importance of rendering aid to charitable and other deserving causes. Their noble club premises, adjoining the station at Hammersmith and the garage of the London General Omnibus Company, were erected by the company in 1914, and it is in keeping with the interest that Sir Albert Stanley, the managing director, has manifested in the affairs of the staff and employees of the London Traffic Group, to find that the men have named the buildings the "Albert Stanley" Institute. Apart from the cost of the caretaker, the employees are responsible for the maintenance of the Institute, but they have one or two ways of self-aid when they desire to benefit other institutions. Recently they invited their friends to three dances, and from the proceeds sufficient money was obtained to entertain 110 wounded soldiers from the hospitals in Hammersmith to a substantial tea and concert on December 5. In undertaking this task the members accomplished a work of far greater importance than they have imagined it to be. The magnitude of London leads to the idea that everybody's business is no one's business; hence there is danger of the wounded soldiers ceasing to arouse sympathy now that they have become such familiar objects in the streets. An entertainment of the character of that arranged by the District Railwaymen is a valuable means of aiding a soldier's convalescence. From 2.30 to the time when tea was served the military visitors found plenty to occupy attention in the various departments of the institute, and during the repast they were enlivened by the excellent orchestra of the Institute, conducted by Mr. J. Ryman. In the provision of the spread a number of local business establishments contributed gifts, while a company of talented artists supplied a high-class programme. The proceedings were presided over by Lieutenant F. T. Chapman, who, like some of the men in the room, has to use a crutch. Yet he is still serving the country during his convalescence by acting as military representative at the Hounslow Tribunal. Before the war Mr. Chapman was assistant to the chief engineer of the District Railway. Among the workers to whom credit is due for the success of the proceedings were Messrs. W. S. Every, H. G. Jeffs, A. J. Dalley, G. J. Cashman, C. Thurston, W. Hilton, G. Clarke, and G. Garrad. Wives and daughters of the members were indefatigable in waiting upon the guests at the tea.

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SIR ALBERT STANLEY "TO TAKE OFFICE."

It is understood that Sir Albert Stanley, managing director of the London Underground Railways and the London General Omnibus Company, will be one of a number of business men who will be included in the new Government which is being formed by Mr. Lloyd George, who on Thursday became Prime Minister. Sir Albert's name was associated with the presidency of the Board of Trade. For some months past he has assisted the Ministry of Munitions as director of munitions transport. He received his knighthood on the occasion of His Majesty the King's birthday in June, 1914. His work in the development of travelling facilities in and beyond the Metropolitan area has made his name well known in the transport world. Although Sir Albert was born in Derby in 1875 his youth was spent in the United States, where he was educated in public schools and technical colleges, and thereafter devoted himself to electric railway work. For twelve years he was manager of the Detroit United Railways and the Public Service Railways of New Jersey. After the Underground Electric Railways of London had completed their work of construction and equipment, Sir Albert came over from the States and took up the position of manager, becoming managing director on the resignation of Sir George Gibb. As the number of undertakings associated with the underground company increased by processes of amalgamation or exchanges of shares, so the sphere of his work widened until now he is managing director of the Metropolitan District Railway, London Electric Railway, Central London Railway, City and South London Railway, London General Omnibus Company, and the Associated Equipment Company. He is also a director of the London United Tramways and the London and Suburban Traction Company, which undertakings are also associated with the Underground Company, and has played an important part in the consolidation of the various interests and in the organisation of the scheme of passenger facilities that those undertakings represent.

MISCELLANEOUS NEWS AND NOTES.

Electric Omnibuses for Lancaster.—Two of three Edison Accumulator omnibuses ordered by Lancaster Corporation Tramways Committee have been delivered. The bodies were made by the Brush Electrical Engineering Company.

Entering a Car Reserved for Children.—At Aberdare on November 29 a man, who was fined 10s. for assaulting a woman conductor, was stated to have boarded a car reserved for school children, pushing the conductor aside with his elbow, and refusing to leave when requested.

Sale of Petrol in Ireland.—An Army Council order under the Defence of the Realm Regulations gazetted last night forbids the sale of motor spirit in Ireland, except to persons holding a licence, signed by the competent military authority, permitting the purchase of the amount specified in the licence.

The Tramway and Light Railway Association.—The Government having taken over Caxton House, Westminster, the Tramway and Light Railway Association have secured offices in Sanctuary House, Tothill Street, Westminster, nearly opposite Caxton House. The telephone number will remain as before, viz., Victoria 2110.

The Petrol-Propelled Car at Stirling.—In his remarks at the annual meeting of the Stirling and Bridge of Allan Tramways Company, the chairman (Mr. H. F. Brand) referred to the heavy increase in the cost of working the horse-drawn cars, and added that the petrol car, which was introduced a few years ago, was more lucrative to the company than the horse cars.

Wellington Employees on Service.—Sixty-eight employees of Wellington, N.Z., Corporation Tramways are on active service. The Council has allowed the difference between the military pay and the normal wages prior to enlistment. The total strength of the staff and employees of the tramway department now number 563, including 68 officers and 495 employees.

United Kingdom Manufacturers Represented in U.S.A.—H.M. Consul-General in New York (Mr. C. Clive Bayley) requests United Kingdom manufacturers who have branches, agents or other representatives in the United States to forward to him the addresses of such representatives, as these will be of great assistance to him in dealing with the frequent inquiries he receives from American merchants.—*Board of Trade Journal.*

Sale of Oxford Tramway Rails.—A loan of £23,600 was obtained by Oxford Corporation for the removal of the horse tramway rails and the reconstruction of the roads in tar and tarviated macadam. The rails were sold for £2,714 and the setts for £762, while setts to the value of £681 were taken into stock. Although the rails were not sold until after the war had been in progress for a considerable period, and until estimates had thrice been invited, the purchaser is stated to have disposed of the rails at a considerable profit.

Suggested Siding for a School for Defective Children.—On account of the danger of embarking and disembarking of the 113 physically defective, and 43 mentally defective' children attending Fairmuir School on the main tramway line owing to the passing traffic, Dundee Tramways Committee have asked the general manager to report upon the subject of constructing a cross-over or a short siding. Two cars are used for the conveyance of the children, and the School Board pay the Tramways Committee 12s. a day.

Energy from Portsmouth for the Horndean Light Railway.—While the Portsdown and Horndean Light Railway Company are engaged in remodelling their power installation, Portsmouth Tramways Committee are supplying them with energy at a charge of 1½*d.* per unit. It was stated at a meeting of the Committee that on a former occasion they had spent a large sum on the provision of machinery to supply the railway, but although the plant was subsequently left on their hands, it was now practically all utilised for the Portsmouth undertaking.

Omnibus Traffic on a Rural Road.—Since the Court of King's Bench decided against them in the action for damages for wear of a rural road by their omnibuses, the Oxford Tramways Company have changed the route of their vehicle in the Abingdon Rural Council's District. The route to Abingdon is now entirely on the main roads belonging to the County Council, but the change is not relished by the residents at Boars Hill, at whose instance the service was run, for they now have a mile or more to walk. The damages awarded to Abingdon Council work out at 3¾*d.* per car mile of the omnibuses and chars-à-bancs.

Recognition of a Woman Conductor's Alertness.—Mrs. Jones, a conductor employed by the Rhondda Tramways Company, was on December 2 presented with a marble clock in recognition of her promptitude in applying the brake and bringing to a standstill a car which was running out of control down Pentre Hill. Mr. H. Holliday, chief engineer and general manager of the company, in making the presentation on behalf of the subscribers, said that had it not been for the presence of mind of Mrs. Jones there might have been loss of life, as the car was crowded with colliers. She had done her duty well at considerable personal risk.

Lift System in Wellington (N.Z.).—H.M. Trade Commissioner in New Zealand (Mr. R. W. Dalton) has forwarded the following further particulars relative to the construction of a lift system between the lower levels of Wellington City and Wellington Terrace. (The original notice appeared in the "Board of Trade Journal" of November 16):—"At a meeting of the City Council on September 21 plans for the construction of the system were approved. The lift, an inclined tramway, is to cost about £5,000; the length of the viaduct will be 5 chains; and the height attained about 150 ft. The gradient will be 1 in 2.36, and the viaduct will carry two lines of rails, enabling two cars to be used; these will be co-ordinated, so that the down car will assist in hauling the up car, and the winding gear will be operated by electric power."

No Contribution for Renewals at Dundee.—The Tramways Committee recently granted a suggestion from the Medical Panel Committee to carry panel patients attending the Royal Infirmary from High Street to the gate for a halfpenny on showing their medical cards between the hours of 4.30 p.m. and 8.30 p.m. until March 31. It was on account of the shortage of medical practitioners and the darkening of the streets that the suggestion was made. Councillor G. A. Johnston, chairman of the Tramways Committee, stated that the last increase of pay to the tramways employees had wiped out any surplus that they expected to be able to put to the renewals fund this year according to the estimate of the manager. Any privilege of this kind must be at the expense of the general users of the cars, and unless they conserved their interests they might have to face the question of increased fares.

Tramway on a By-Pass Road.—A deputation of property owners and tradesmen in High Street, Northfield, recently waited upon the Lord Mayor of Birmingham and expressed objection to the Town Planning Committee's scheme for a by-pass road which would carry a tramway on a sleeper-constructed track in order to avoid passing through the High Street. The deputation feared that the new road would lessen the value of property in the High Street, and lead to the development of a new shopping centre near the tramway. The Lord Mayor (Alderman N. Chamberlain) said that the by-pass road had been designed in order to enable the tramway to be carried on sleepers throughout its whole length. This method of construction would be impossible in the village without such a widening as would involve the Corporation in heavy cost. His lordship promised to lay their views before the committee, but he did not hold out much hope of any alteration in the proposal.

Liability of Irish Guaranteeing Areas.—In the Chancery Division at Dublin, Mr. Justice Barton has dismissed with costs the suit of the Wicklow County Council v. the Dublin and Blessington Steam Tram Company and the Dublin County Council, in which plaintiffs claimed declarations that the total liability of the guaranteeing area was limited to 1s. in the £ (Poor Law valuation) in any one year, and that the arbitrator's award of June, 1916, so far as it purported to place liability on plaintiffs, was unenforceable or only so to the extent of 1s. in the £. His Lordship held that the Wicklow Council's guarantee was not limited to 1s. in the £, and that the guaranteeing area in County Wicklow is bound to pay the full amount necessary to make up the 5 per cent. guaranteed dividend, and also a share of the loss on working expenses, subject to any Treasury contribution that might be received. He held that the bond referred to in the arguments was ultra vires, and that it should not have been entered into.

Opportunity to Abandon Unprofitable Sections.—The difficulty of obtaining rails and the need for repairing tracks gives rise to the suggestion that there could not be a more favourable opportunity for doing away with any route that has proved hopelessly unprofitable and is not essential for the public convenience. As already recorded, the Croydon Corporation have decided to double one of their tracks and to relay another by utilising the rails of the Whitehorse Road route, upon which traffic has been discontinued on two occasions after controversy. The London United Tramways Company are also using the rails of disused lines for renewals elsewhere, but have arranged that the local authorities shall not regard this action as an abandonment of the section. In connection with the need for track renewals at Ipswich, Mr. F. Ayton, the general manager, has recommended that when the time arrives for relaying the Norwich Road line the question of abandoning the distant section running into Whitton should be considered, this having always proved a dead loss. Mr. Ayton makes a similar reference to Burrell Road and Bath Street, and he suggests that the rails of the three sections referred to should be taken up and used for repairs elsewhere.

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Threatened Strike on Christmas Day.—As Walsall Tramways Committee have not agreed to the employees' application for a holiday on Christmas Day, but are willing to run a reduced service, the men have met and passed a resolution threatening to call a strike on that day.—Maidstone Council have refused to grant a request by the local trades council for the entire suspension of the tramway service on Christmas Day, but they have decided to suspend the service on the Tovil route.—In view of the fact that the inter-running services in east and north London will continue, and for the convenience of munition workers who will be visiting their friends, Leyton Urban Council have decided not to accede to the application of their employees to suspend the tramway service on Christmas Day. The service, however, is to be considerably limited.—Bradford Tramways Committee have agreed to entirely suspend the car service, but at Aberdeen no action was taken on an application by the men's union for a whole day's cessation of running.

PERSONAL.

Mr. W. L. Hitchens, chairman of Cammell, Laird and Co., Ltd., is mentioned for high office in the new Government under Mr. Lloyd George.

Sir William Slingo has been elected to the Council of the Institution of Electrical Engineers to fill a vacancy created by the resignation of Captain R. J. Wallis-Jones, due to military service.

Mr. Arthur Towle.—At the request of the President of the Board of Trade, the Midland Railway Company have placed the services of Mr. Arthur Towle temporarily at the disposal of the Department for work in connection with the regulation of meals and economy in the use of food.

Mr. J. M. McElroy, on concluding two days' sittings as arbitrator in the fares and stages dispute between Rawtenstall and Bacup Corporations, was accorded a vote of thanks on the motion of Sir Henry Maden. Subsequently Mr. McElroy walked over the whole length of the route in company with a representative from each side.

CONTRACTS AND ORDERS.

Yarmouth Council have placed an order with the Yarmouth Stores, Ltd., for overcoats for women conductors at 30*s.* 6*d.* each.

Melbourne Council have placed contracts for insulated cable with Messrs. Johnson and Phillips, Ltd., and for bare copper cables with the British Insulated and Helsby Cables, Ltd.

Victorian Railway Commissioners have awarded the subjoined contracts:—Thompson & Co., railway and electric tramway crossing; Electric Construction Co., 5 kw. motor-generator set for battery charging of baggage trucks, and switchboard and connections for single-phase motor drive; Edison Swan Electric Company, six months' supply of incandescent electric lamps; Gibson, Battle & Co., plant for impregnating electric apparatus with insulating varnishes; R. W. Cameron & Co., transformers during five years.

FINANCIAL REPORTS AND MEETINGS.

Straker-Squire, Ltd.—The directors have declared a further dividend of 1*s.* per share for the current year.

Brazilian Traction, Light and Power.—The board of this company announce a quarterly dividend of 1½ per cent. on the preference shares.

United Electric Tramways of Monte Video.—The directors announce an interim dividend on preference shares for half-year to September 30 at the rate of 6 per cent. per annum, less tax. No interim dividend has been declared on ordinary shares for the half-year.

Wellington Corporation Tramways.—The report of Mr. W. H. Morton, general manager, Wellington Corporation Tramways and Electric Lighting Departments, states that the revenue for the year ended March 31, 1916, amounted to £187,804, an increase of £20,533; the working expenses were £118,817 (increase £7,679), and the net surplus £27,120, the latter being an increase of £11,751. The ratio of expenses to revenue at 63.25 shows a decrease of 3.17 per cent. Extensions have and are being much hampered by the high price of materials owing to war conditions and the scarcity of labour. The traffic has shown a phenomenal increase, the passengers having increased by 3,170,258 to 28,087,773. Notwithstanding the difficulty of obtaining suitable men and the fact that about 80 per cent. of the conductors were men of less than one's year's experience, the full service has been maintained.

Birkenhead Corporation Tramways.—Mr. C. Clarke, general manager, Birkenhead Corporation Tramways, in his report for the year ended March 31, 1916, states that the income was £72,820, or £4,212 higher than ever previously recorded. As compared with last year the increase was £7,035. The working expenses amounted to £38,833, a decrease of £634 as compared with the previous year, while the profit on working was £33,987, an increase of £7,669. Interest on capital, sinking fund and income tax required £23,417, leaving a balance of £10,570. Of this amount £4,000 has been paid to the relief of rates, £2,000 to the reserve fund, and £4,570 to the renewals fund. War allowances to dependents of employees on active service amounted to £1,580, and the war bonus to employees to £884. All wounded sailors and soldiers have been allowed free travelling on the cars. In August women were employed as cleaners and in September as conductors, and their work has been satisfactory. Owing to the increased cost of supplies the Tramway and Electricity Committees mutually agreed to an increase in the price of energy from .953*d.* to 1.053*d.* The average consumption per car mile was 2.044 units. The percentage of working expenses to receipts was 53.32. The total revenue per car mile averaged 14.84*d.*, and the working expenses, including power cost, 7.91*d.*

Provincial Tramways Company, Ltd.—Mr. Andrew Beattie, D.L., presiding at the annual meeting, said that in 1914 the net profit was £40,297, and in 1915 it was £48,789. This year the net profit was £52,288 15*s.* 5*d.* The prosperity they had enjoyed for the past two years was owing somewhat to the war profit they had made. In the North of England and on the East Coast their business was interfered with greatly by air raid warnings and the restricted lighting. With regard to the expenses, the price of coal had advanced a very great deal, and at one station it amounted to £854. As to crude oil, which was used for the Diesel engines, their last contract was 74*s.* per ton, whereas the contract now was for £7 7*s.* per ton. Wages, rates and taxes had also increased. Nevertheless, the past year was the best in the history of this company. The carry-over was £19,071, as against some £11,000 last year, but they would have to pay upon war profits, and although they did not yet know what the amount would be, it would make a hole in the large carry-over. He moved. "That the report and accounts be received and adopted, and that a final dividend of 10*d.* per share and a bonus of 6*d.* per share equal to a dividend of 1*s.* 4*d.* be paid on the ordinary shares of the company, subject to deduction of income tax at 4*s.* in the £." Mr. Samuel Hern (Cardiff), seconding, said it should be recognised that out of the reserve fund a large sum would be absorbed by work of reconstruction, which was long overdue. The following resolution was carried with acclamation:—"That the thanks of the shareholders are hereby presented to the managers of the local companies and their staffs, and also to the employees of the Company at such respective branches."

NEW PUBLICATIONS.

The British Thomson-Houston Company, Ltd., of Rugby, have issued a new descriptive and illustrated list dealing with control equipments for winders and hoists. These have been specially developed for the control of motors used for furnace hoists in steel works, and for winding and surface haulage in collieries, etc. The operator can start, stop and reverse the motor by means of the master controller, the contractors closing automatically when the controller handle is moved. The master controller is of the B.T.H. standard tramway type.

Apropos of the recommendation in favour of establishing a British Trade Bank made by the Committee appointed by the Board of Trade, Messrs. Butterworth and Co., London, have published in pamphlet form (1*s.*) two lectures on "How Our Overseas Trade is Financed." These discourses were delivered in connection with the London Chamber of Commerce by Mr. F. E. Steele, Fellow of the Institute of Bankers, and were included in the author's volume entitled "Present Day Banking." The author observes that "the problem whether this country needs a bank of which the avowed object would be the development of facilities, and especially overseas facilities, not provided by existing banks, cannot be solved unless the facilities afforded by existing banks are properly appreciated." The pamphlet should contribute towards that object

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty four of the principal tramway undertakings in the United Kingdom for the week ended November 25 give total receipts of £171,541, or £14,401 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or sixty-six more than for the corresponding week. The receipts this year were at the rate of £76 18*s.* 5*d.* per mile of single track, and last year at the rate of £72 12*s.* 11*d.*, thus showing an increase for the week of £4 5*s.* 6*d.* per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

The Coventry Chain Company, Ltd., of Coventry, have received the following letter:—"With reference to the new pattern Coventry noiseless chain, known as the N.L. type, we have recently examined a motor to countershaft drive fitted with one of these chains two years ago. The machine to which the chain was fitted has been used by us as a hack machine, having been driven by a large number of different persons. The mileage recorded to the credit of this machine was 32,000, during which time the chain called for adjustment only three times. At the last time of overhauling the chain was found to be in good condition, and did not call for renewal. We think the life and freedom from necessity of adjustment with your N.L. type of chain is a considerable improvement on any other chains."

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET, LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
at home and abroad.

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Last.	Name.	Paid.	Price, July 27 1914	Cash. Dec 27	A Week Ago.
5%	5%	Alabama Traction. 5% 1st. Mt.	—	67	77½	78½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4¾	6 2/6	6 2/6
4%	4%	Do. 4% Deb. ...	100	91	66½	66½
4½%	4½%	Do. 4½% Deb. ...	100	98½	74	74½
5%	5%	Do. 5% Deb. ...	100	96	64xd	64xd
1/-	7d	Auckland Elec. Trams. Ord. ...	1	1⅝	21/-	21/-xd
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	93½	93½
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11½	10½	10½
4½%	4½%	Do. 4½% Deb....	100	96	82½	82½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	91½	91½
⅜	$1	Brazilian Trac. & Power Ord. ...	$100	66	48½	49½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	85	90
4/-	4/-	Brisbane Elec. Trams. Otd. ...	5	7⅜	6¾	6¾
2/6	2/6	Do. 5% Cum. Pref.	5	5	85/-	85/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92½	92
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	46	46
6%	5%	Do. Pref. Ord....	100	106	48	48
5%	5%	Do. 5% Cum. Pref.	100	103	66	67½
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	87	88½
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	60½	60½
—	£3	Brit. Elec. Trac. Ord.	100	—	34½	34½
—	6%	Do. 6% Cum. Part Pref. ...	100	—	76½	77
5%	5%	Do. 5% Deb.	100	92	80	80
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	69½	69½
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	79½	79½
3/-	6/6	Calcutta Tramways, Ord. ...	5	7½	6½	6½
1/3	1/3	City of B.A. Trams.	5	5½	85/-	86/3
5/-	4/-	Dublin United Trys 6% Pref.	10	12	10½	10½
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79½xd	79½xd
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	27/6	27/6
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅜	2/1½	2/1½
6/-	6/6	Lanarkshire Trys. Co. ...	10	10½	9⅜	9⅜
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9d.	9d.*	Llandudno & Colwyn B. Ord. ...	1	—	9/10½	9/10½
—	1d.	Lond. & Sub. Traction Ord. ...	1	1/16	2/3	2/3
6d.	6d.	Do. 5% Pref.	1	1/16	7/10½	8/4½
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	66	66
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88	88
5%	5%	Do. 5% Inc. Deb.	100	88½	78½	78
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	47½	47½
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	96/6	96/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	66½	66½
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	67½	67½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	74½	74½
$1½	$1½	Mexico Trams. Common ...	$100	70	22½	27
5%	5%	Do. 1 Mt. 5% G.B.	—	84	30	30
6%	6%	Do. 6% Mt. Bds.	100	76	30	30
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95	95
1/-*	1/2½*	National Steam Car	1	15/16	21/-	20/-
9d.*	9d.*	New General Traction	1	¾	7/9½	7/9½
8½d.	6d.	Northern Gen. Trans. Ord. ...	1	8¼	13/9	14/-
6/-	5/-	Para Elec. Rlys. Ord.	5	4½	68/-	68/-
5%	5%	Do. 5% 1st Deb.	100	89½	74½	74½xd
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80½	80½
6d.	6d.	Potteries Elec. Train. 5% Pref.	1	15/16	11/-	11/4½
10d.	8d.	Provincial Trams. Ord.	1	¾	20/6xd	20/6xd
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	82	84
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	91½	91½
5%	5%	1st. Mt. 5% 50 yr.	100	89½	74½	75½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	88½xd	90½
5%	5%	Do. 5% Perp. Deb.	100	99½	77½	77½
—	—	Singapore Elec. Trams	5/-	½	4/10½	4/10½
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	94	94
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	81	81
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	98	98
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	77	77
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	9/3	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	95/-	95/-
—	—	Metropolitan Dist. Ord. ...	100	21½	16½	15½
—	—	Undgd. Elec. Rys. of London ...	10	2½	38/9	40/-
		Do. "A"	1/-	⅜	5/10½	6/-
4½	4½	Do. 4½% Bds of 1933 Rd.	—	99	101½	101½
6	6	Do. 6% 1st Cum. In. Db.	100	114	101½	101½
6	6	Do. 6% In. Bonds Rd. ...	—	88	90½	91½

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1915	Latest Return. 1916	Aggregate. Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	Dec. 2	£51,954	£52,450	49	£2,454,431	+ £5,392
Auckland.....(28 days)	Nov. 20	20,910	20,729	20	105,015	+ 979
Ballarat and Bendigo ...	Oct. 8	3,401	3,390	28	22,110	+ 600
Brazilian Traction Mlrs.	Oct.	6,793,000	7,037,000	44	68,286,000	+4,035,890
Brisbane	Nov.	31,120	26,740	48	357,160	+ 10,086
British Columbia.....$	Oct.	538,826	573,544	18	2,202,570	+ 128,873
Buenos Aires Lacroze ...	Nov.	46,033	42,603	22	207,402	— 16,614
Burmah Tramway ... Rs.	Sept.	22,163	23,749	9	48,161	— 839
Calcutta.....Rs.	Dec. 2	66,149	72,607	49	3,276,325	+ 178,015
Cape Town	Oct.	...	14,238	...	...	...
Carthagena & Herrerias..	Nov.	2,090	2,252	48	27,391	+ 7,552
Cordoba	Oct.	13,441	13,533	31	98,087	+ 740
Costa Rica	July	3,046	3,223	...	...	...
East India	Nov.	2,065	1,942	17	9,067	+ 613
Hong Kong .....$	Oct. 28	10,804	12,398	46	623,225	+ 149,607
Kalgoorlie	Sept.	2,997	2,788	39	23,267	— 1,849
La Plata	Nov.	4,564	4,342	48	46,399	— 429
Lima	Oct.	32,211	33,292	44	337,350	+ 16,858
Lisbon .....Escu.	Oct.	...	203,955	...	...	...
Madras .....(2 weeks)	Nov. 30	25,837	29,664	47	695,170	+ 51,009
Manila	July	23,750	33,700	31	887,739	+ 39,986
Manaos .....Rs.	Sept.	...	141,286	...	...	...
Melbourne	May	...	69,275	...	...	...
Montevideo	Nov.	28,407	28,404	4	28,404	— 3
Pernambuco	Dec. 3	3,242	3,500	48½	147,947	— 458
Peruvian .....$	Nov.	751,720	925,820	22	4,514,650	+ 656,873
Port Elizabeth	Oct.	...	3,131	...	...	...
Rangoon	Nov.	5,028	5,033	48	51,404	— 1,839
Shanghai .....$	Nov. 1	28,332	28,578	...	...	...
Singapore .....$	Oct. 28	1?,052	12,617	42	542,827	+ 55,385
Toronto.....$	Oct.	792,001	907,460	44	8,913,224	+ 970,618
Winnipeg	Oct.	286,146	278,817	44	2,740,271	— 59,324

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Name.	Week ended	Latest Return. 1915	Latest Return. 1916	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Aggregate. Incr. or Dec.
Aberdare U.D.C.	Nov. 28	£328	£397	+ 79	35	£13,915	+ £1,612
Aberdeen Corporation...	,, 29	1,714	1,782	+ 68	30	50,457	+ 2,950
Accrington Corp.	,, 15	504	550	+ 46	33	19,376	+ 794
Ayr Corporation	Dec. 2	230	262	+ 31	29	13,239	+ 1,180
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	,, 3	1,284	1,521	+ 237	35½	54,926	+ 5,901
Birmingham Corp.	,, 2	14,687	13,637	— 1,050	35	564,191	+ 59,683
Do. Motor Omnibuses	,, 2	721	1,022	+ 301	35	35,571	+ 5,241
Blackburn Corp.	Nov. 29	1,012	1,061	+ 49	35½	45,182	— 926
Blackpool & Fleetwood.	,, 25	247	284	+ 37	47	42,411	+ 4,869
Blackpool Corp.	*	...	...	...	...	...	...
Bolton Corporation.....	Dec. 3	2,426	2,731	+ 305	36	103,712	+ 7,626
Bournemouth Corp.....	,, 6	1,717	1,781	+ 64	36	84,927	+ 6,818
Bradford Corporation ...	,, 2	5,622	6,445	+ 823	35	242,250	+ 9,313
Brighton Corporation ...	,, 3	837	958	+ 121	35½	46,316	+ 5,086
Bristol	,, 1	9,776	9,831	+ 55	48	484,826	+ 23,881
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	Nov. 25	1,404	1,523	+ 119	35	60,058	+ 3,503
Burton-on-Trent Corp...	Dec. 3	270	250	— 20	35	9,838	— 493
Bury Corporation.....	,, 3	1,144	1,242	+ 98	35½	51,354	+ 2,548
Cardiff Corporation.....	Nov. 25	2,388	2,871	+ 483	34	104,246	+ 10,516
Chatham & District.....	,, 30	981	1,172	+ 191	48	59,234	+ 3,372
Chesterfield Corp.	,, 30	243	242	— 1	35	9,828	+ 277
Colne Corporation	,, 25	210	240	+ 30	...	...	...
Cork Electric	,, 30	439	474	+ 35	48	24,566	+ 488
Croydon Corporation ...	*	...	...	...	...	...	...
Derby Corporation	Dec. 2	950	978	+ 28	35½	40,434	+ 2,948
Dover Corporation	*	...	...	...	...	...	...
Dublin & Lucan	,, 1	114	135	+ 21	22	3,700	+ 312
Dublin United	,, 1	5,624	6,052	+ 428	48	292,637	+ 1,280
Dundee City	Nov. 29	1,280	1,316	+ 36	28½	39,899	+ 1,005
East Ham Corporation	Dec. 2	1,215	1,154	— 61	35½	46,369	+ 91
Exeter Corporation.....	,, 1	306	390	+ 84	35	14,452	+ 839
Glasgow Corporation	,, 2	20,997	23,347	+ 2,350	26½	623,046	+ 48,792
Glasgow Subway.....	,, 2	1,232	1,246	+ 13	48	55,385	+ 4,344
Glossop (U. Elec. Supp.)	,, 2	119	134	+ 15	49	6,823	+ 683
Halifax Corporation.....	Nov. 28	1,808	1,872	+ 64	34½	78,928	+ 1,019
Do. Motor Omnibuses	,, 28	38	48	— 10	34½	1,743	— 10
Hastings & District.....	Dec 1	667	850	+ 183	48	50,109	+ 3,358
Huddersfield Corp.	,, 2	2,317	2,595	+ 278	35	100,742	+ 8,720
Hull Corporation	,, 2	3,121	3,072	— 48	35	110,520	+ 1,824
Ilford U.D.C.	,, 2	577	601	+ 24	35	24,242	+ 1,309
Ilkeston Corporation ...	*	...	...	...	...	...	...
Ipswich Corporation	,, 2	444	389	— 55	35	18,563	— 1,119
Isle of Thanet	,, 2	202	236	+ 34	9	2,505	+ 58
Kilmarnock Corp.	,, 2	150	176	+ 26	28½	5,111	+ 186
Lanarkshire	Nov. 30	1,901	2,186	+ 285	48	111,188	+ 16,094
Lancashire United	,, 29	1,451	1,724	+ 273	48	88,122	+ 5,166
Leeds City.....	Dec. 2	8,203	9,331	+ 1,128	36	349,032	+ 32,033
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	,, 2	695	830	+ 135	28½	25,538	+ 3,253
Leyton U.D.C.....	Nov. 30	1,400	1,444	+ 44	35	58,741	+ 1,097
Liverpool Corporation...	Dec. 2	12,672	13,963	+ 1,291	48½	680,220	+ 39,119
Llandudno & Colwyn B.	Nov. 24	171	199	+ 28	51½	18,610	+ 1,221
London County Council	,, 15	44,493	47,356	+ 2,863	32½	1,596,652	+ 152,038
London Genl. Omnibus	*	...	...	...	...	...	...
London United.....	*	...	...	...	...	...	...
Lowestoft Corporation...	*	...	...	...	...	...	...
Maidstone Corporation..	,, 30	170	185	+ 15	35	7,795	— 80
Manchester Corp.....	Dec. 2	16,558	17,999	+ 1,441	33	668,073	+ 38,038
Met. Elec. Trys.	*	...	...	...	...	...	...
National Steam Car.....	*	...	...	...	...	...	...
Nelson Corporation	Nov. 11	187	185	— 2	32½	6,993	+ 538
N'castle-on-Tyne Corp.	Dec. 2	5,609	6,742	+ 2,133	35	237,481	+ 15,002
Newport (Mon.) Corp....	,, 2	793	914	+ 121	35	34,065	+ 4,152
New St. Helens & Dist.	Nov. 29	834	965	+ 131	22	25,373	+ 2,047
Northampton Corp.....	Dec. 1	591	710	+ 119	35	25,306	— 649
Nottingham Corp.....	Nov. 30	3,397	3,776	+ 381	35	138,582	+ 6,652
Oldham Corporation ...	Dec. 3	2,022	2,191	+ 169	36	89,875	+ 5,366
Portsmouth Corp.....	,, 2	1,947	2,149	+ 202	...	...	...
Preston Corporation.....	Nov. 29	910	1,091	+ 181	34½	39,017	+ 5,031
Provincial	Dec. 2	1,867	1,892	+ 25	9	18,756	+ 338
Reading Corporation.....	Nov. 30	699	848	+ 149	34½	30,452	+ 2,616
Rhondda Tramways.....	,, 30	1,089	1,255	+ 166	48	61,905	+ 5,459
Rochdale Corporation...	Dec. 2	1,419	1,579	+ 160	35½	63,760	+ 2,619
Rotherham Corp.	Nov. 29	1,138	1,600	+ 462	34½	54,569	+ 13,817
Salford Corporation.....	Dec. 4	4,760	5,126	+ 366	34½	196,214	+ 10,885
Sheffield Corporation....	,, 3	9,029	10,496	+ 1,467	36½	382,340	+ 58,282
Southampton Corp.....	Nov. 29	1,334	1,573	+ 239	34½	59,127	+ 5,844
Southend-on-Sea Corp...	,, 29	532	643	+ 111	35	34,256	+ 4,067
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.....	Dec. 2	707	808	+ 101	35½	29,912	+ 1,644
Sunderland Corp.....	,, 3	1,460	1,565	+ 105	35	58,485	+ 4,772
Sunderland District...	Nov. 29	536	624	+ 88	5	3,185	+ 507
Swindon Corporation ...	,, 22	165	192	+ 27	33½	7,050	+ 290
Torquay Tramways.....	,, 30	353	463	+ 110	48	28,681	+ 2,477
Tyneside Trys. & Tmrds.	,, 29	473	571	+ 98	22	14,744	+ 1,270
Wallasey Corporation ...	Dec. 2	1,084	1,166	+ 82	31½	49,461	+ 3,196
Walsall Corporation.....	,, 2	725	776	+ 51	49	39,551	+ 3,493
Walthamstow U.D.C....	,, 2	702	913	+ 211	35	39,221	+ 6,868
Warrington Corp.....	Nov. 23	438	491	+ 53	34	17,413	+ 1,469
West Ham Corporation	,, 30	2,809	2,912	+ 103	34½	113,557	+ 4,837
Wigan Corporation	,, 30	1,416	1,695	+ 279	35	59,430	+ 5,352
Yorkshire (W. Riding)...	Dec. 3	1,372	1,768	+ 396	49	86,282	+ 9,148

* Issue of Traffic Returns suspended during the War.

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(*January* 13, 1916.)

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THE

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.

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WEEKLY LIST OF TENDERS INVITED.

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Tenders should be submitted to the Crown Agents for the Colonies, 4, Millbank, Westminster, S.W., on or before noon, Friday, Dec 29.

The following reference to be quoted: W/Trinidad Rly. 534/2.

COUNTY BOROUGH OF WIGAN.

TRAMWAYS DEPARTMENT.

The Tramways Committee of the Corporation of Wigan invite teuders for the supply of a 30-h.p. Motor Tower Wagon.

Full particulars can be obtained on application to Mr. Frank Buckley, General Manager, Corporation Tramways, Market Place, Wigan.

Sealed tenders, endorsed "Tender for Motor Tower Wagon," addressed to the Chairman of the Tramways Committee, Town Clerk's Office, King Street West, Wigan, must be delivered not later than 12 noon on Monday, January 8th, 1917.

The Corporation do not bind themselves to accept the lowest or any tender.

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SATURDAY, DECEMBER 16, 1916.

MILITARY SUBSTITUTION SCHEME.

In view of Russia's vast resources in men, the report sent a few days ago by an English newspaper correspondent, who has travelled along the Russian front to Roumania, that Austrian prisoners are employed as drivers on some of the smaller Russian tramways is surprising. Although the drain on our manhood for work connected with the war is much greater than is the case with Russia, and the employment of German prisoners on farm labour has been suggested, there are reasons that render their utilisation for tramway work unthinkable in this country at the present time. There are fortunately other ways and means of meeting the present requirements; and it is satisfactory to know that steps have been taken to prevent tramway undertakings from being deprived of their older motormen and skilled men in other departments by the operation of the Military Service Act. A speedy depletion was threatened as a result of the recent raising of the age of exemption. Already the action of the military representatives on a number of local and appeal tribunals had led to the drafting of single and married men of over thirty years of age into the Army, and consequently some services of lesser importance have had to be curtailed. Owing to the foresight of the Council of the Municipal Tramways Association in arriving at a prompt understanding with the Substitution Committee of the Recruiting Department, an arrangement has now been effected by which tramway undertakings are to release all fit men under thirty years of age, excepting specially skilled men in responsible positions. In exchange the military authorities will return to the tramway undertakings soldiers of "low medical category" who were previously employed by the tramways. Some time must, of course, be allowed for the carrying of the scheme into effect. The first step is for managers to furnish information concerning the enlistment of any of their employees, and the number, etc., of men of military age now employed and their medical classification. The procedure is outlined in another column, and the concession will be generally appreciated by those responsible for tramway operation. It may be anticipated that the number of men thus brought back to their old employment will suffice to fill a considerable number of vacancies. Even the return of a conductor will be valuable, especially if his physical standard will enable him to be trained as a motorman. Hitherto the limited number of discharged soldiers available through the medium of labour exchanges has not been of appreciable advantage to tramway managers, even when the men have been used only as conductors. According to the testimony of the manager of a Scotch tramway, the impatience of the travelling public—inexcusable in these times of stress—has served to dishearten the men and they have left the service. Another manager has informed the tribunal that ex-soldiers who had passed through a motorman's course had proved unsatisfactory owing to lack of nerve. These shortcomings will not exist in the case of men who are returning from the Forces to their old employment. They are likely to take up their duties with enthusiasm, for men who are not fit for active service find military life far from pleasant. They lack the invigorating stimulus of keenness that in the case of men physically fit is developed by danger and difficulty. Hence they are likely to be more useful if brought back to their old employment in the knowledge that they are releasing men better fit for the front line task for which they themselves patriotically volunteered in the critical stages of the war.

CHANGES IN THE BOARD OF TRADE.

As forecasted in our columns last week, Sir Albert H. Stanley has been appointed President of the Board of Trade in the new Government, and a seat will be found for him in the House of Commons. Public opinion generally welcomed the selection by Mr. Lloyd George of a successful business man and experienced organiser to fill an office which is closely connected with the prosecution of the war and the maintenance of our trade and industry. The work of the department has increased so enormously during the war that no one man could possibly control efficiently all of its branches. The offices are scattered in twenty different buildings between the Tower and Victoria Station, and it is an open secret that an entire reorganisation was indispensable. The marine branch, through the appointment of Sir Joseph Maclay as controller of shipping, will be transferred to a new department, while the food department will come under the food controller and the new Ministry of Labour will no doubt take over the labour branch, including the employment exchanges and arbitration machinery. It is expected that the Board of Trade will retain administration of the railways, trading with the enemy, winding up enemy companies, patents, bankruptcy and the commercial department. Some interesting changes in organisation and methods of work may be anticipated.

The daily newspapers apparently have not been well informed with respect to the details of the new president's career. In some journals he has been described as an American. Others have referred to him as "general manager of the great system known as the American Electric Railways." Such an undertaking does not exist. In view of the lack of publicity which marked Sir Albert's appointment as director of transport to the Ministry of Munitions a few months ago, there is some excuse for the omission to refer to his valuable services in that department. The details of Sir Albert Stanley's work in the United States and London were given in our last issue, and to those particulars we may add a reference to the encouragement he has afforded to the exchange and discussion of ideas by a staff organisation, and the effective use of advertising as a means of teaching Londoners and others to become acquainted with the facilities for locomotion that are at their disposal, with consequent benefit to the traffic receipts of the allied companies. Another matter in which Sir Albert Stanley has excelled is his desire to secure what he would term fair dealing with the many thousands of employees in the various undertakings with which he is connected.

TRAFFIC AFTER AIR RAID WARNINGS.

There appears to be a difference in the orders issued by the authorities in London and the provinces as to the course to be adopted by tramway traffic in the event of anticipated attacks by aircraft. The Commissioner of Police for the Metropolis has transmitted to the tramway authorities copies of an Order made by the Field Marshal Commander-in-Chief, Home Forces, under the Defence of the Realm Regulations, ordering a scheme of action to be taken by authorities controlling tramways within the Metropolitan Police District in connection with anticipated attacks by aircraft. Amongst other matters the Order provides for the normal service of cars throughout the area. On receipt of the Order, Ilford Urban Council passed the following resolution while instructing the tramway manager to carry out the terms of the Order: "That this Council places on record its emphatic opinion that the order is not conducive to the safety of the inhabitants, and that the authorities be informed accordingly." Reports from Liverpool, Salford, and other towns show that on the occasion of the eastern coast raid on November 27, the power was at once switched off from the tramways on receipt of the warning, the cars remaining in the streets.

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EMPLOYEES' DEMANDS.

An arbitration tribunal, composed of Mr. W. Mackenson, K.C., Sir George Wyatt, and Mr. Frank Smith (the latter a labour member of the London County Council who has served on the Highways Committee), on December 11 took evidence in an application by the employees in the traffic section of the London County Council Tramways for an increase of 15 per cent. on all current rates of wages. The claim was based on the higher cost of living, and over 5,000 workers were affected. A concession of 2*s.* a week in addition to the existing war bonus of 3*s.*, and 6*d.* for each employee's child under 14 years of age, was offered by the Council but this offer was declined. The proceedings were private. Mr. J. R. Bruce, deputy chief officer of the Tramways department, represented the Council, and Messrs. Neal and Watson, union officials, put forward the employees' case.

Bradford Tramways Committee on December 11 referred back for further consideration their special sub-committee's report of the negotiations with the employees in reference to the application for increased wages and a revision of working conditions. The sub-committee offered, it is understood, payment of time and a half for the "seventh day" in lieu of time and a half for Sunday, which the men had asked for. Another offer is the payment at the rate of time and a half for all time worked above the normal day (which may be 11½ hours) in lieu of time and a half for all above the 9½ hours' day, which the men claimed. The motormen and certain shed men have been offered an increase in wages which would be equivalent to something like half the savings that might be effected in the consumption of current during the next six months. The men's representatives have rejected the offers, and they also declined to submit the whole matter to the Committee on Production.

Bolton Council have adopted a recommendation by the Tramways Committee to refer to the Committee on Production a letter received from Lancashire District Council of Tramways and Vehicle Workers, giving 21 days' notice to withdraw their members' labour on Bolton Tramways unless their application for an advance of wages and better conditions of labour were agreed to. Alderman J. Miles, chairman of the Tramways Committee, stated that they were under the impression that the employees approved of the committee's action in going to arbitration. A movement was on foot involving practically every undertaking in Lancashire and Cheshire, and it had been decided to obtain a decision from the tribunal on how far the men's demands were reasonable. It was not only a matter of wages. The men were trying to stop the cars on certain days, and there were other things, and it was felt it was of sufficient importance for the tramways authorities of the two counties to go before the Committee on Production with it. The Town Clerk informed the Council that as the tramways was a certified undertaking under the Munitions of War Acts that prevented a strike.

Chester Town Council have approved the recommendation of the Tramways Committee that the cashier, the inspector and the clerk, and all drivers and cleaners and the fitter's assistant be granted a war bonus of 2*s.* per week. These advances will cost the department about £100 per annum. With the additional bonus the drivers will now receive an average of 37*s.* 0*d.* per week of 60 hours, and 34*s.* 6*d.* per week of 60 hours. No bonus will be paid to the women conductors, as their wages average 27*s.* 6*d.*, or 25*s.*, depending on their route work.

MELBOURNE TRAMWAYS & OMNIBUS COMPANY.

The directors, in their report for the year ended June 30, 1916, state that the company's leases of the cable tramway lines expired on June 30. Under the provisions of an Act of the Victoria Parliament passed in December, 1915, replacing the Melbourne Tramways Trust by a Tramway Board, constituted in January last, to control the cable system, all the company's freeholds, rolling stock and plant required to work the lines were vested in the Board on July 1, 1916. The Board at that time also took over the whole of the company's working staff. Under this Act the amount of compensation to be paid to the company is to be fixed by a Supreme Court judge, Mr. Justice Cussen, who has been appointed arbitrator by the Government. The award is to be given not later than January 1, 1917, and the final payment must be made within the following three months. The Board is also to pay interest at the rate of 5 per cent per annum from July 1, 1916, on the amount of the award. The profits of the Company for the year amounted to £334,493, of which £312,000 has been paid in dividends and bonuses, leaving a balance of £32,493, thus increasing the amount brought forward from last year to £50,443, which has been carried to a special reserve account. The traffic receipts have increased by £74,151, and the number of passengers by 8,642,820. The paid up capital of the company is £400,000.

During the past year the directors continued to purchase outstanding debentures. The loss on realisation amounted to £6,328 18*s.* 2*d.*, which has been provided out of the general reserve. To this reserve has been carried the usual allotment for renewals of the lines, and to it has been debited the amount spent. The final distribution will depend upon the valuation of the arbitrator of the assets taken over by the Tramway Board. The directors have distributed £10,709, in accordance with a resolution passed at the shareholders' meeting in January last, to long service employees who have reached an age at which they could not hope to remain long at work.

The chairman of the Board and managing director, Mr. F. B. Clapp, resigned in June on account of failing health, a position he had held since the inception of the company. The directors express their sense of Mr. Clapp's great abilities, his rare judgment and foresight, and his just dealings with the whole of the staff throughout his long control of the company's affairs. The directors also record with regret the death of one of their number, Mr. C. M. Puckle. The remaining directors are Mr. W. G. Sprigg, chairman, Mr. John Grice, and Mr. David Hunter. The secretary is Mr. H. A. Wilcox.

ENLISTMENT OF TRAMWAY EMPLOYEES.

SUBSTITUTION SCHEME.

Some weeks ago Mr. C. J. Spencer, hon. secretary of the Municipal Tramways Association, in an interview with Lord Derby, director-general of recruiting, made various suggestions for a scheme of substitution which it was hoped would enable tramway undertakings to obtain the men required for operating the cars, while it would secure desirable men from the tramway staffs for military service. Subsequently a deputation of the Municipal Tramways Association, comprising the President (Mr. Henry Mozley), the Hon. Secretary (Mr. C. J. Spencer), and Messrs. J. B. Hamilton, A. R. Fearnley, J. M. McElroy, and A. Baker, waited upon Lord Derby, and as a result details of a substitution scheme were arranged.

Under this scheme all fit men under 30 years of age excepting specially skilled men in responsible positions are to be released. The tramway authority of each municipality will supply to the War Office a list of men who have left their service and taken up military duties, giving name, previous occupation, rank, unit, regimental number, where stationed, etc., together with a list of the men of military age at present employed, classified as "A" or "B1," stating age, occupation, martial condition and medical classification.

Every man released from the tramway undertaking for military service will be replaced by a man of low medical category taken from the army who was previously employed on the tramways, and therefore fully conversant with the duties.

The lists of men on Home Service, and also on Overseas Service are to be made out separately and forwarded direct to the Secretary, War Office, S.W. Reference D.R.4.

RAILWAY FARES AND TRAINS.

By an Order in Council published on Wednesday evening, important powers are conferred on the Board of Trade under the Defence of the Realm Act. The new regulation (7B) is as follows:—

1. The Board of Trade may, for the purpose of making the most efficient use of railway plant or labour, with a view to the successful prosecution of the war, make orders for all or any of the following purposes, namely:

(*a*) for enabling the Board of Trade to take possession of any private owners' wagons and to use those wagons in such manner as they think best in the interests of the country as a whole, on such conditions as to payment, use, and otherwise as may be provided by the Order;

(*b*) for enforcing the prompt loading or unloading of wagons, by making failure to load or unload in accordance with the Order an offence;

(*c*) for curtailing any statutory requirements as to the running of trains or affording facilities on certain lines or at certain stations, or for requiring the disuse of any such line or station, in cases where the curtailment or disuse appears to the Board of Trade to be justified by the necessity of the case;

(*d*) for restricting or prohibiting certain classes of traffic (including the carriage of passengers' luggage) on railways either absolutely or subject to any conditions for which provision is made by the Order;

(*e*) for modifying any statutory requirements with respect to the maximum amount of passenger fares.

2. If any person acts in contravention of or fails to comply with any of the provisions of an order so made, he shall be guilty of a summary offence against these Regulations.

3. Any order may be made so as to apply generally to all railways or to any class of railways or to any special railway.

4. Any order of the Board of Trade under this Regulation may be revoked, extended, or varied, as occasion requires.

L.C.C. TRAMWAY MATTERS.

At the meeting of the London County Council on Tuesday last the Highways Committee reported that the Rolling Stock Conciliation Board had decided that hand moulders and foundry metal pourers of the tramway department shall receive additional war wages of 3*s.* a week, making 7*s.* a week in all. The cost of giving effect to this agreement is estimated at £63 for the remainder of the current financial year, and £160 for 1917-18. The decision of the Permanent Way and Building Conciliation Board provides that an advance of 1*d.* an hour, to be regarded as war wages, shall be made to carpenters, plasterers, slaters, plumbers, and plumbers' mates, but the present war bonus of 3*s.* a week paid to the latter is to cease. An advance of ½*d.* an hour, to be regarded with the previous advance of ¾*d.* an hour, obtained under the award of the Court of Arbitration is to be made to bricklayers and labourers. The cost of giving effect to this agreement is estimated at £125 for the current financial year and £205 during 1917-18.

A request has been received from moulding machine operators, stokers, and labourers employed at the foundry shop at the central car repair depot for 3*s.* a week additional wages. This application has been referred to the Rolling Stock Conciliation Board.

Tenders are to be invited for the supply of 100 pony wheel axle forgings for electric cars.

OMNIBUS FARES.

Mr. Gillett asked if the attention of the Highways Committee had been called to alterations in fares made by the Omnibus Company on routes not served by the tramways, whether any similar changes had been made on tramway routes, and what was the respective lengths of 1*d.* and 1½*d.* omnibus and tramway fare stages.

Mr. G. H. Hume (chairman of the Committee) replied that his attention had been drawn to certain alterations on omnibus routes, but had no information as to alterations in omnibus fares on tramway routes. He did not know of any systematic basis of determining are stages, but particulars could be ascertained in any special case.

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MISCELLANEOUS NEWS AND NOTES.

A Johannesburg Extension.—An extension of the tramways at a cost of £5,000 has been authorised by the Johannesburg Municipal Council.

Electric Vehicles for Municipalities.—A sub-committee has been appointed by Bolton Council to consider and report upon the desirability of purchasing battery vehicles.

Through Running Agreement.—On and after January 1 next the through running by the Blackburn and Accrington cars will be on the basis of an equal car mileage on each Corporation's track.

L. and N.W. Electrification.—Successful trial runs were made on Sunday last over the new electric lines of the London and North-Western Railway from Willesden to Watford, a distance of about ten miles. Some particulars of the undertaking were given in our issue of November 9.

Suggested Purchase of Middlesbrough and District Tramways.—Committees have been appointed by the Middlesbrough, Stockton, and Thornaby Councils to consider the desirability of the local authorities purchasing the undertaking of the Middlesbrough, Stockton and Thornaby Tramways Company.

Dick, Kerr & Co., Ltd., to acquire Car Works.—The directors of the United Electric Car Company, Preston, have issued a circular advising shareholders to accept an offer made by Dick, Kerr & Co., Ltd., to acquire the preference and ordinary shares of the undertaking. A meeting has been called to consider the proposal.

Temporary Abolition of Halfpenny Fares—Hull Council, on Dec. 13, agreed to abolish halfpenny stages until the end of the war, owing to the deficiency of £20,000 in the current year's receipts. At Darlington, halfpenny fares have been suspended on Saturdays after 1 p.m., on account of insufficient cars to deal with the traffic.

Extensions after the War.—In the list of works proposed to be undertaken at Hull after the war, the Tramways Committee have included the extension of the tramways in Anlaby and Beverley Roads, a loop in Waterworks Street, completion of workshops, additional plant at the generating station, and the provision of coal storage, probably in the form of overhead bunkers, with elevators.

German Tramways and War Work.—A telegram from Amsterdam states that General Groener has ordered that all German tramway lines shall be placed at the disposal of the War Department for the transport of goods needed by that department. Hitherto the tramways in practically all the German cities have stopped running for the public at 10.30 p.m. daily and have been used from eleven o'clock till five o'clock by the War Department. It is probable that, in some of the large cities like Berlin, the time-limit will be made earlier.

New Work at Newcastle and Leeds.—In order to cope with increased traffic a junction is to be made between the tramways in Union Road and Miller's Lane, Newcastle-on-Tyne. The rails leading out of the south-end of the depôt in Miller's Lane are also to be joined up with the rails in Shields Road. The total cost, including the price of the land, is estimated at £6,500. Leeds Tramways Committee propose to apply to the Board of Trade for sanction to the construction of junction lines at Green Hill, Wortley, and also in Whitehall Road and Royds Lane.

Tramway Stoppages at Birmingham.—Birmingham was visited by a dense fog on Monday morning, which delayed suburban trains and impeded street traffic. The illumination of the shops and offices made heavy and unexpected demands upon the Electric Supply Department. The tramway service was suspended from before 10 a.m. until shortly before one, and there was another long stoppage in the afternoon. A few days previously the tramway cars were stopped from 10 a.m. to 6 p.m. owing to the inability of the supply department to supply energy.

Ashton Tramways Purchase.—On December 6 the Ashton-under-Lyne Corporation decided to promote in the next session of Parliament a Bill to make provision in respect to the purchase of the Oldham, Ashton, and Hyde Tramway Company's undertaking. Agreements were also confirmed with the Parish Councils of Waterloo and Bardsley for the transfer of their powers to the Corporation. The Bill also authorises the Corporation to construct additional tramways in the borough and to provide and run omnibuses. It is hoped to establish through interrunning between Ashton and Oldham.

Gramophone Experiment on a Liverpool Car.—Following our announcement last week of the introduction of a telephonic horn on the Seaforth and Great Crosby Tramways, Liverpool, to enable the motormen to announce the names of stopping places during the dark hours, comes the news that Mr. C. W. Mallins, general manager of the Liverpool Corporation Tramways, is experimenting with an electro-magnetic route indicator. This is a gramophone device invented by Mr. Mallins in order to enable passengers to ascertain their whereabouts. These arrangements show a desire on the part of managers to study the convenience of passengers, but there would be no need for them if conductors faithfully discharged their duty.

Christmas Day.—Manchester Corporation Workmen's Special Committee have refused an application for payment of treble time for work on Christmas Day and Good Friday by the electricians and wiremen in the tramways department. Burnley Tramways Committee have refused an application for the suspension of traffic and payment of wages to the employees for the holiday. Walsall Tramways Committee have now decided to follow the example of the South Staffordshire Tramways Company and of Wolverhampton Corporation Tramways Committee by abandoning the Christmas Day running, for which the Walsall employees have always received double pay. As a heavy car traffic is anticipated in Sheffield on Christmas Day the Tramways Committee have decided to give their employees a holiday, with wages, on Sunday, December 24 At Newport the cars will be withdrawn on Christmas Day.

Provisional Order to Increase Fares.—Darlington Corporation. are applying to the Board of Trade under the war emergency powers for a Provisional Order to enable them to make a charge of more than one penny on certain sections. Alderman C. W. Starmer, chairman of the Tramways Committee, in introducing the proposal to the Council, observed that so long as they were restricted to a penny fare from the centre of the town they could not extend the lines to Haughton-le-Skerne. It was not right that they should not be allowed to charge more than one penny to that place when they charged one penny now for about half the distance, seeing they would have to spend about £8,000 in laying the track. He had no doubt that if the proposed amended Order was obtained the fare for the two miles to Harrowgate Hill would be increased to three-halfpence.

Women Drivers.—In Keighley, where there are no gradients of any difficulty, a number of women are being trained as drivers of the Corporation tramcars. The male employees express themselves as not opposed to the innovation as a temporary measure provided the women receive the same remuneration as the men. Owing to the shortage of motormen at Maidstone, women have been introduced as drivers. Councillor Lyle, chairman of the Tramways Committee, has expressed satisfaction with the way in which they discharge their duty. Notwithstanding the aid received from volunteer motormen at Newcastle-on-Tyne, the shortage of motormen has become so serious that the management on December 12 began training women as car drivers with a view to placing them in charge of cars. Fourteen of the women conductors have been trained to drive tramcars at Southport, but as yet the need has not arisen to utilise them. A considerable number of women are working as drivers of the Vienna tramcars. In that city there are 5,000 women conductors.

Edinburgh Tramways.—The Edinburgh and District Tramways Company have made new proposals to the Corporation as to arrangements to be made on the termination of the lease, in June, 1919. The company in the course of the earlier negotiations asked £75,000 for the cars, which the Corporation's advisors valued at £25,000. It is understood that the company have now offered to compromise on the basis of a valuation of £50,000 for the cars, or £250 each. They are also willing, it is reported, to undertake the upkeep of the rails for a period of six years after the expiry of the lease in 1919. The Tramways Committee on December 13 remitted the offer to the City Council, in order that it might be sent back to the Committee with powers to consider the proposals. The question of taking steps to secure electrification before the expiration of the lease is complicated owing to the high prices of materials while the war lasts, and the difficulty of securing rails and equipment. At the meeting already referred to the Tramways Committee also sent forward to the Council the proposal by Councillor Deas to extend the tramways to Queensferry and to link up with Rosyth by means of a ferry.

T.O.T. Staff Women's Club.—A club for the women employed on the administrative staff of the Underground Railway Group at their Head Office, Electric Railway House, and at the Earl's Court and Oxford Circus ticket sorting offices, has been formally opened by Sir Albert Stanley, managing director. The premises are entered from Earl's Court station, and the building consists of five storeys. The basement contains the kitchens and offices, the cooking apparatus, which is entirely electrical, consisting of four baking ovens, large boiler and steamer, boiling plates, grill, etc., for the cooking of 200 meals. The first floor is taken up by rest and club rooms with a small library. The alterations to the building and the equipment, etc., have been carried out by the Architectural Sub-Department, under Mr. Z. E. Knapp, Underground Railway manager for maintenance and construction. Sir Albert Stanley, in opening the club, referred to the fact that there were in the employ of the companies associated with the Group, over 4,000 women engaged on work formerly performed by men, and he complimented them upon the earnest and careful way in which they had undertaken the duties. A vote of thanks was accorded to Sir Albert on the motion of Mr. H. E. Blain, operating manager, and Miss Smith, superintendent of the ticket sorting staff, and, after tea and light refreshments had been served, a musical programme was rendered.

Regulations Regarding Copper and Aluminium.—By virtue of an Order issued on December 10, under the Defence of the Realm Act, the Minister of Munitions forbids any transaction in relation to the sale or purchase of copper unless authorised by special permit. The Minister of Munitions has made a further Order prohibiting the use of copper, whether wrought or unwrought, in any kind of manufacture except for the purposes of a contract or order for the time being in existence certified to be within Classes "A" or "B" of circular L.33 of March 31, 1916, as to control of output. The Order of the Minister of Munitions of November 6, 1916, relating to the manufacture of copper wire and cable containing copper is cancelled. Applications in reference to this Order should be addressed to the Ministry of Munitions, Priority Branch, 1, Caxton Street, Westminster. An Order has also been issued including various classes of aluminium and alloys thereof as war material and cancelling the Order dated July 21 last. Mr. C. Budd, of Messrs. Vivian, Younger & Co., London, and Mr. M. Rucker, of Messrs. Henry Rodgers, Sons, and Co., London, have been appointed as a committee to advise the Ministry on the purchase and distribution of copper. Mr. Budd is chairman of directors of the London Metal Exchange, and Mr. Rucker is chairman of the Metal Exchange. Mr. Stroud, of Messrs. C. Tennant and Co., will act as secretary.

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PERSONAL.

Mr. T. P. Dudin, charge shift engineer at Greenwich generating station of the L.C.C., has resigned as from December 24.

Mr. J. C. Williams, tramways manager and electrical engineer to Frith Urban Council, has been voted an increase of £50 per annum in his salary.

Mr. W. T. Robson, general manager of Southampton Corporation Tramways, has been granted by the Tramways Committee an increase in salary of £100 per annum.

Company-Sergeant-Major J. Carson, of the Australian Infantry, has been awarded the Military Medal for bravery in action in France. He emigrated to Australia five years ago from Glasgow, where he worked as a motorman on the Corporation Tramways.

Mr. J. W. S. Clunas has been confirmed in the appointment of city electrical engineer at Cape Town, to which he was appointed when Mr. W. F. Long became general manager of Cape Town Tramways Company. The salary is £900 per annum, with yearly increases up to £1,200.

Mr. R. Owen, chief engineering assistant, Leeds Electricity department, on resigning that position to become borough electrical engineer at Wigan, has received from the Electricity Committee a resolution congratulating him upon obtaining the appointment, expressing regret at his resignation, and offering best wishes for his future career.

Mr. J. Hodge, M.P., the first British Minister of Labour is secretary of the British Steel Smelters' Society. It is understood that he will be in control of a new department the precise sphere of the activities of which has yet to be defined. There is reason to believe that it will take over the whole of the labour administration of the Ministry of Munitions.

Mr. R. E. Prothero, the Minister of Agriculture in Mr. Lloyd George's Administration, served as a member of the Royal Commission on Railways and of the Departmental Committee on the Home Production of Food last year. He is 64 years of age, is a barrister, an alderman of Bedfordshire County Council and agent in chief to the Duke of Bedford.

Mr. E. R. Alford, a conductor of the London United Tramways, who was called up as a reservist of the 1st Dragoon Guards at the outbreak of war, has been granted a commission as second lieutenant in the Loyal North Lancashire Regiment, and has also been awarded the Military Cross for special gallantry in leading an attack at an "unknown" place on October 14 last.

Presentation to a Lady Official.—An interesting presentation was recently made by the Southampton women conductors to Miss Abbott, woman instructor and inspector on her resignation of that position owing to her approaching marriage. The presentation was made by Mr. W. T. Robson, the general manager, who remarked that he had assisted at many presentations in many capacities, but this was the first occasion at which he had presided at a presentation to a lady official. Alderman Dunsford, chairman of the Tramways Committee, paid a tribute to the excellent work done by the women, which reflected the greatest credit on Miss Abbott, who had been responsible for their training, and had carried out her duties to the entire satisfaction of the manager and the committee.

Lieutenant E. R. Wilmshurst, Royal Fusiliers, who died on December 1, aged 21, from wounds, was the second son of Mr. T. P. Wilmshurst, borough electrical engineer and tramways electrical engineer at Derby. Three of Mr. Wilmshurst's sons enlisted on the outbreak of war, each was wounded and afterwards was awarded a commission.

Private G. W. Falconer, a Chesterfield Corporation Tramways conductor, aged 19, who has been killed by a shell while sitting in a trench in France waiting to be conveyed to hospital, enlisted in 1914. He fought in the Gallipoli landing and was invalided home wounded and suffering from shell shock. In June last he was sent to France and a month later was wounded. On recovery, he was again drafted to the western front and took part in severe fighting.

CONTRACTS AND ORDERS.

Mossay & Co., Ltd., have received a contract from Salford Council for an Orwell battery-driven wagon for the Electricity department, at £705.

Manchester Corporation have placed the following contracts:—Tramways department: Supply of steam disinfector, T. Bredford and Co., Ltd., Salford. Electricity department: Low pressure water and exhaust steam pipes and supports Aiton & Co. Ltd.; "Lea" recorder, Lea Recorder Co., Ltd.; compressor equipment and drills, Ingersoll-Rand Co., Ltd.; high and low pressure steam and water pipework, Stewarts & Lloyds, Ltd.; valves, Blakeborough and Sons; supply of cable, Western Electric Co., Ltd.; British Insulated and Helsby Cables, Ltd.; and W. T. Glover and Co.

FINANCIAL REPORTS AND MEETINGS.

Birmingham District Power and Traction Company.—At special meetings of the shareholders the capital of this company has been reduced from £1,050,000 to £700,000.

Manx Electric Railway Company.—The accounts for the year ended September 30 show a loss of £735, in addition to £9,000 for debenture interest, and the adverse balance brought forward was increased to £10,171.

Yorkshire (West Riding) Electric Tramways Co., Ltd.—A final dividend of 3 per cent., being at the rate of 6 per cent. per annum on account of the dividend accrued on the 6 per cent. preference shares, will be paid on January 1, 1917.

L.C.C. Traffic Receipts.—The traffic receipts for the two weeks ended November 29, 1916, were £88,686, an increase of £2,572 as compared with the corresponding period last year. The number of passengers was 21,369,416, an increase of 1,011,434. From April 1 to November 29 (thirty four and a half weeks) the total receipts were £1,685,339, an increase of £154,612 on the corresponding week of 1915. The route mileage was 141.67.

Remarkable Half-year at Glasgow.—During the first six months of the financial year of the Glasgow Corporation Tramways the total receipts were £623,046 as compared with £574,254 in the corresponding period of last year an increase of £48,792. The number of passengers carried was 193,800,839, as compared with 179,590,102, an increase of 14,210,737. The weekly receipts are now about £23,347, an increase of £2,349 as compared with the corresponding weeks of last year, while the number of passengers is about 7,485,148, an increase of 711,000.

Costa Rica Electric Light and Traction Company, Ltd.—The report for the year ended June 30, 1916, shows that the net earnings in Costa Rica after charging all expenses amounted to £19,210 16*s.* 7*d.*, a decrease of £2,451 8*s.* 8*d.* The net surplus profit for the year is £2,790 8*s.* 1*d.*, which the directors propose to carry to the credit of discount and commission on debenture issued account. The business of the company has continued to suffer from the interruption of exports and the general upset of trade relations incident to the European war. The cost of all stores and materials has greatly increased owing to the high exchange. Everything used in the business has to be imported and paid for in gold, while the earnings have temporarily depreciated in national currency.

Stirling and Bridge of Allan Tramways Company.—At the annual meeting Mr. H. F. Brand (chairman) stated that owing to the extraordinary increase in all working expenses, and particularly in the cost of provender and litter, the year's working had resulted in a loss of £107. If they compared the receipts with the expenditure of 1914 they would show a handsome profit. Comparing 1914 with 1916 they found that there was an increase of £800 on horsing expenses alone. General expenses showed an increase of £200, due almost entirely to the rise in wages. They had been unfortunate in regard to horses, having lost four, that being largely due to slippery streets. They had tried to minimise the increased expenditure by increasing the fares, and the increase was not a serious one. The directors regretted to report the death of Mr. John Kinross, who had been an active member of the board for over 40 years.

Isle of Thanet Electric Tramways and Lighting Company.—The report of the directors for the year ended September 30 shows a profit balance of £9,742, compared with £10,050 the previous year. The Board state that the Isle of Thanet has passed through another year of severe depression. The gross receipts from the undertaking —£28,835—show a falling off from 1914-15 of £2,752 (and of £19,671 when compared with the last full pre-war year, *i.e.*, September 20, 1913). It was possible, however, to effect a saving of £2,445 in working expenses, and the profit balance for the year is sufficient to cover all the interest charges and to leave a sum of £389 17*s.* to be carried forward to the next account. The tramway receipts have shown some increase since the end of the financial year, but the directors state that they must look forward to the termination of the war before they can expect a substantial improvement in the position of the undertaking. The accounts show a profit on the motor omnibus services of £515. From the sale of scrap material £1,025 was received. Allowances to dependents of staff serving with the colours amounted to £355, and £280 was spent on insurance against aerial bombardment. These items are included in the capital and liabilities account, which also includes the following items: Third party insurance reserve, £5,000; permanent way reserve, £14,309; rolling stock reserve, £1,924.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-four of the principal tramway undertakings in the United Kingdom for the week ended December 2 give total receipts of £175,232, or £15,042 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or sixty-six more than for the corresponding week. The receipts this year were at the rate of £78 11*s.* 7*d.* per mile of single track, and last year at the rate of £74 1*s.* 2*d.*, thus showing an increase for the week of £4 10*s.* 5*d.* per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

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ABCHURCH YARD, CANNON STREET, LONDON, E.C.
ENGINEERS & CONTRACTORS.
Complete Equipment
TRAMWAYS & LIGHT RAILWAYS
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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. Dec 14.	A Week Ago.
5%	5%	Alabama Traction. 5% 1st. Mt.	—	67	76¾	77½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4⅞	62/6	62/6
4%	4%	Do. 4% Deb. ...	100	91	66½	66½
4½%	4½%	Do. 4½% Deb. ...	100	98½	74	74
5%	5%	Do. 5% Deb. ...	100	96	61½	61xd
1/-	7d	Auckland Elec. Trams. Ord. ...	1	1⅝	21/-	21/-
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	93¾	93¾
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11½	10½	10½
4½%	4½%	Do. 4½% Deb....	100	96	82½	82½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	91½	91½
$½	$1	Brazilian Trac. & Power Ord....	$100	66	46½	48½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	84	85
4/-	4/-	Brisbane Elec. Trams. Ord. ...	5	7½	6½	6¾
2/6	2/6	Do. 5% Cum. Pref.	5	5	77/6	85/-
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92½	92½
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	46	46
6%	5%	Do. Pref. Ord....	100	106	47⅜	48
5%	5%	Do. 5% Cum. Pref.	100	103	66	66
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	87	87
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	60⅞	60⅞
—	£3*	Brit. Elec. Trac. Ord.	100	—	34½	34½
—	6%	Do. 6% Cum. Part Pref. ...	100	—	74¼xd	76½
5%	5%	Do. 5% Deb.	100	92	80	80
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	69⅜	69⅜
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	79⅜	79⅜
3/-	6/6	Calcutta Tramways, Ord. ...	5	7¼	6¼	6½
1/3	1/3	City of B.A. Trams.	5	5½	85/-	85/-
5/-	4/-	Dublin United Trys 6% Pref.	10	12	10 1/16	10½
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79¾xd	79¾xd
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	27/6	27/6
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅜	2/1½	2/1½
6/-	6/6	Lanarkshire Trys. Co.	10	10½	9 25/32	9 25/32
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9/8 l.	9d.*	Llandudno & Colwyn B. Ord....	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	13/16	2/4½	2/3
6d.	6d.	Do. 5% Pref.	1	15/16	7/10½	7/10½
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	64	66
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88	88
5%	5%	Do. 5% Inc. Deb.	100	88½	78⅜	78⅜
4%	4%	Lon. Unt. Trns. 4% 1st Mt. Db.	100	55	45	47½
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	96/6	96/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	66⅜	66⅜
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	67⅜	67⅜
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	74½	74½
$1⅜	$1⅜	Mexico Trams. Common ...	$100	70	22⅜	22⅜
5%	5%	Do. 1 Mt. 5% G.B.	—	84	30	30
6%	6%	Do. 6% Mt. Bds.	100	76	30	30
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95	95
1/-*	1/2½*	National Steam Car	1	13/32	20/6	21/-
9d.*	9d.*	New General Traction	1	⅛	7/9¾	7/9¾
8⅝d.	6d.	Northern Gen. Trans. Ord. ...	1	13/32	13/9	13/9
6/-	5/-	Para Elec. Rlys. Ord.	5	4¼	68/-	68/-
5%	5%	Do. 5% 1st Deb.	100	89½	74½	74½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80⅜	80⅜
6d.	6d.	Potteries Elec. Tram. 5% Pref.	1	13/32	11/-	11/-
10d.	8d.	Provincial Trams. Ord.	1	⅜	20/6	20/6xd
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	91½	91½
5%	5%	1st. Mt. 5% 50 yr.	100	89½	74½	74½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	88½xd	88½xd
5%	5%	Do. 5% Perp. Deb.	100	99½	77½	77½
—	—	Singapore Elec. Trams	5/-	¼	4/10½	4/10½
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100⅛	94	94
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	81	81
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	97¾	98
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	77	77
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	9/5	9/3
3/-	3/-	Do. 6% Cum. Pref.	5	4⅜	94/3	95/-
—	—	Metropolitan Dist. Ord. ...	100	21⅜	15⅞	16⅜
—	—	Undgd. Elec. Rys. of London ...	10	2½	39/6	38/9
		Do. "A"	1/-	⅜	5/10½	5/10½
4½	4½	Do. 4½% Bds of 1933 Rd.	—	99	100½	101½
6	6	Do. 6% 1st Cum. In. Db.	100	114	101	101½
6	6	Do. 6% In. Bonds Rd. ...	—	88	91¾	90⅝

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1915	Latest Return. 1916	Aggregate. Wks.	Aggregate. 1916	Increase or Decrease
Anglo-Argentine	Dec. 9	£54,110	£52,955	50	£2,507,386	+ £4,237
Auckland.....(28 days)	Nov. 20	20,910	20,729	20	105,015	+ 979
Ballarat and Bendigo ...	Oct. 8	3,401	3,390	28	22,110	+ 600
Brazilian Traction Mlrs.	Oct.	6,793,000	7,037,000	44	68,286,000	+4,035,890
Brisbane	Nov.	31,120	26,740	48	357,160	+ 10,086
British Columbia.....$	Oct.	538,826	573,544	18	2,202,570	+ 128,873
Buenos Aires Lacroze ...	Nov.	46,033	42,603	22	207,402	— 16,614
Burmah Tram.&LightRs.	Nov. 16	23,695	26,824	18	...	+ 8,205
Calcutta.....Rs.	Dec. 9	67,263	72,671	50	3,348,996	+ 183,423
Cape Town	Oct.	...	14,238	...	...	...
Carthagena & Herrerias..	Nov.	2,090	2,252	48	27,391	+ 7,552
Cordoba	Oct.	13,441	13,533	31	98,087	+ 740
Costa Rica	July	3,046	3,223	...	...	...
East India	Nov.	2,065	1,942	17	9,067	+ 613
Hong Kong .....$	Nov. 4	10,589	13,750	47	636,975	+ 152,768
Kalgoorlie	Sept.	2,997	2,788	39	23,267	— 1,849
La Plata	Nov.	4,564	4,342	48	46,399	— 429
Lima	Oct.	32,211	33,292	44	337,350	+ 16,858
Lisbon .....Escu.	Oct.	...	203,955	...	...	...
Madras .....(2 weeks)	Nov. 30	25,837	29,664	47	695,170	+ 51,009
Manila	July	23,750	32,700	31	887,739	+ 39,986
Manaos .....Rs.	Sept.	...	141,286	...	...	...
Melbourne	May	...	69,275	...	...	...
Montevideo	Nov.	28,407	28,404	4	28,404	— 3
Pernambuco	Dec. 10	3,199	3,553	49½	151,500	— 104
Peruvian .....$	Nov.	751,720	925,820	22	4,514,650	+ 656,873
Port Elizabeth	Oct.	...	3,131	...	...	...
Rangoon	Nov.	5,028	5,033	48	51,404	— 1,839
Shanghai .....$	Nov. 8	26,864	30,689	...	...	...
Singapore .....$	Nov. 4	12,126	12,833	43	555,660	+ 56,092
Toronto.....$	Oct.	792,001	907,460	44	8,913,224	+ 970,618
Winnipeg	Oct.	286,146	278,817	44	2,740,271	— 59,324

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	Latest Return. 1916	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Aggregate. Incr. or Dec.
Aberdare U.D.C.	Dec. 5	£363	£393	+ 30	36	£14,309	+ £1,645
Aberdeen Corporation...	,, 6	1,656	1,881	+ 225	27	52,339	+ 31,749
Accrington Corp.	Nov. 29	498	520	+ 22	38	20,419	+ 860
Ayr Corporation	Dec. 9	235	256	+ 21	36	13,495	+ 1,201
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	,, 10	1,378	1,445	+ 67	36½	56,371	+ 5,968
Birmingham Corp.	,, 9	15,846	13,850	— 1,996	36	578,042	+ 57,687
Do. Motor Omnibuses	,, 9	814	905	+ 91	36	36,476	+ 5,332
Blackburn Corp.	,, 6	1,017	1,030	+ 13	36⅔	46,211	— 905
Blackpool & Fleetwood.	Nov. 25	247	284	+ 37	47	42,411	+ 4,869
Blackpool Corp.	*	...	...	...	...	...	...
Bolton Corporation	Dec. 10	2,554	2,685	+ 131	37	106,397	+ 7,757
Bournemouth Corp.	,, 13	1,701	1,759	+ 58	37	86,686	+ 6,875
Bradford Corporation ...	,, 9	5,746	5,982	+ 236	36	248,232	+ 9,549
Brighton Corporation ...	,, 10	874	958	+ 84	36⅔	47,275	+ 5,169
Bristol	,, 8	10,023	9,609	— 414	49	494,435	+ 23,467
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation	,, 9	1,499	1,503	+ 4	37	63,166	+ 3,674
Burton-on-Trent Corp...	,, 10	293	248	— 45	36	10,086	— 538
Bury Corporation	,, 10	1,183	1,171	— 11	36⅔	52,525	+ 2,536
Cardiff Corporation	Nov. 25	2,388	2,871	+ 483	34	104,246	+ 10,516
Chatham & District	Dec. 7	1,016	1,028	+ 12	49	60,262	+ 3,384
Chesterfield Corp.	,, 7	251	232	— 19	36	10,061	+ 258
Colne Corporation	Nov. 25	210	240	+ 30	...	...	...
Cork Electric	Dec. 7	451	480	+ 29	49	25,046	+ 517
Croydon Corporation ...	*	...	...	...	...	...	...
Derby Corporation	,, 9	1,016	933	— 82	36½	41,367	+ 2,865
Dover Corporation	*	...	...	...	...	...	...
Dublin & Lucan	,, 8	99	117	+ 18	23	3,817	+ 330
Dublin United	,, 8	5,756	6,070	+ 314	49	298,707	+ 1,580
Dundee City	,, 6	1,264	1,304	+ 40	29⅔	41,204	+ 1,020
East Ham Corporation	,, 2	1,215	1,154	— 61	35½	46,369	+ 91
Exeter Corporation	,, 8	324	363	+ 39	36	14,815	+ 878
Glasgow Corporation	,, 9	21,013	23,130	+ 2,117	27⅔	646,176	+ 51,074
Glasgow Subway	,, 9	1,247	1,284	+ 37	49	56,667	+ 4,382
Glossop (U. Elec. Supp.)	,, 9	127	126	— 1	50	6,949	+ 684
Halifax Corporation	,, 5	1,772	1,865	+ 93	35⅓	80,792	+ 1,112
Do. Motor Omnibuses	,, 5	39	44	+ 5	35⅓	1,787	— 4
Hastings & District	,, 8	678	834	+ 156	49	50,943	+ 3,515
Huddersfield Corp.	,, 9	2,385	2,496	+ 111	36	103,238	+ 8,831
Hull Corporation	,, 9	3,232	3,149	— 83	36	113,670	+ 1,740
Ilford U.D.C.	,, 2	577	601	+ 24	35	24,242	+ 1,309
Ilkeston Corporation ...	*	...	...	...	...	...	...
Ipswich Corporation ...	,, 9	477	381	— 96	36	18,945	— 1,206
Isle of Thanet	,, 9	236	214	+ 22	10	2,720	+ 36
Kilmarnock Corp.	,, 9	149	161	+ 12	29⅔	5,272	+ 198
Lanarkshire	,, 7	1,862	2,111	+ 249	49	113,298	+ 16,342
Lancashire United	,, 6	1,482	1,682	+ 200	49	89,813	+ 5,374
Leeds City	,, 9	8,483	9,051	+ 568	37	358,085	+ 32,764
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	,, 9	697	807	+ 110	29⅔	26,345	+ 3,362
Leyton U.D.C.	,, 7	1,493	1,407	— 86	36	60,148	+ 1,011
Liverpool Corporation...	,, 9	13,382	13,951	+ 569	49½	694,171	+ 39,683
Llandudno & Colwyn B.	,, 8	168	187	+ 19	1	187	+ 19
London County Council	Nov. 29	42,807	45,367	+ 2,560	34½	1,685,339	+ 154,612
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation...	*	...	...	...	...	...	...
Maidstone Corporation..	Dec. 7	180	176	— 4	36	7,971	— 84
Manchester Corp.	,, 9	17,289	17,400	+ 111	34	685,473	+ 38,408
Met. Elec. Trys.	*	...	...	...	...	...	...
National Steam Car	*	...	...	...	...	...	...
Nelson Corporation	,, 9	181	172	— 9	36½	7,754	+ 590
N'castle-on-Tyne Corp.	,, 9	5,724	6,570	+ 846	36	244,051	+ 15,949
Newport (Mon.) Corp.	,, 9	849	948	+ 99	36	35,013	+ 4,251
New St. Helens & Dist.	,, 6	892	963	+ 71	23	26,336	+ 2,136
Northampton Corp.	,, 8	652	670	+ 18	36	25,975	— 631
Nottingham Corp.	,, 7	3,619	3,544	— 65	36	142,136	+ 6,585
Oldham Corporation ...	,, 10	2,093	2,141	+ 48	37	92,015	+ 5,414
Portsmouth Corp.	,, 2	1,947	2,149	+ 202	...	...	...
Preston Corporation	,, 6	977	1,052	+ 75	35½	40,101	+ 5,105
Provincial	,, 9	1,998	1,839	— 159	10	20,595	+ 251
Reading Corporation	,, 7	786	792	+ 6	35⅔	31,744	+ 2,622
Rhondda Tramways	Nov. 30	1,089	1,255	+ 166	48	61,905	+ 5,459
Rochdale Corporation...	Dec. 9	1,525	1,454	— 71	36½	65,214	+ 2,547
Rotherham Corp.	,, 6	1,162	1,495	+ 333	35⅔	56,064	+ 14,149
Salford Corporation	,, 11	4,922	4,951	+ 29	35⅔	201,165	+ 10,894
Sheffield Corporation.	,, 10	9,400	10,464	+ 1,064	37½	392,864	+ 59,477
Southampton Corp.	,, 6	1,409	1,528	+ 118	35⅔	60,655	+ 5,963
Southend-on-Sea Corp...	,, 6	579	627	+ 48	36	34,874	+ 4,105
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	,, 9	737	780	+ 43	35½	30,691	+ 1,694
Sunderland Corp.	,, 10	1,526	1,548	+ 22	36	60,033	+ 4,793
Sunderland District...	,, 6	510	594	+ 84	6	3,779	+ 590
Swindon Corporation ...	Nov. 22	165	192	+ 27	33⅔	7,050	+ 290
Torquay Tramways	,, 30	353	463	+ 110	48	28,682	+ 2,477
Tyneside Trys. & Tmrds.	Dec. 6	467	562	+ 95	23	15,306	+ 1,364
Wallasey Corporation ...	,, 9	1,137	1,133	— 4	32½	50,594	+ 3,192
Walsall Corporation	,, 9	810	761	— 49	50	40,313	+ 3,446
Walthamstow U.D.C.	,, 9	745	900	+ 155	36	42,984	+ 9,901
Warrington Corp.	Nov. 23	438	491	+ 53	34	17,413	+ 1,469
West Ham Corporation	Dec. 7	2,938	2,971	+ 33	35⅔	116,528	+ 4,870
Wigan Corporation	,, 7	1,493	1,614	+ 120	36	61,050	+ 5,473
Yorkshire (W. Riding)...	,, 10	1,610	1,578	— 32	50	87,859	+ 9,116

* Issue of Traffic Returns suspended during the War.

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LANCASHIRE & YORKSHIRE ELECTRIFICATION.

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(*January* 13, 1916.)

A detailed description of the equipment of the Manchester-Bury section, the latest enterprise of the Lancashire and Yorkshire Railway in the electrification of their lines. The first section electrified was the Liverpool-Southport line, which was equipped in 1903-4 by Dick, Kerr and Co., Ltd., on the 500 volt direct current system. In the present instance current at 1,200 volts is sent out on the conductor rails, and the train motors are designed for working at this pressure. The description is accompanied by over 50 clear drawings and photographs.

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

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The following reference to be quoted: W/Trinidad Rly. 534/2.

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SAM FAY, General Manager.

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SATURDAY, DECEMBER 23, 1916.

THE PROVISION OF LIFTING JACKS.

There are conclusive reasons why every car should be provided with a lifting jack. One strong motive should be the desire of a tramway authority not to be regarded as wanting in humane feelings, for coroners' juries have either urged the provision of a jack for every car or advised that one or more of such implements should be within reach at convenient places. Evidence placed before juries in cases in which a child or an adult has been beneath a car has frequently shown that a considerable period has elapsed before a jack could be obtained from a depôt. During the interval the comment of the public has not been of a character that the responsible officials would care to have addressed to them personally. Until within a few years ago powerful jacks of comparatively light weight have been wanting, but as more than one type of suitable machine is now available, the time has arrived for a consideration of the requirements both of small and large undertakings and the manner in which the need can be met. Though the triple requirements as to weight, effectiveness, and price, need now offer no bar, there are districts where the provision of a jack for every car may not be necessary. For undertakings of that class the need from a humanitarian point of view might be met by placing additional jacks in passenger shelters and in special receptacles *en route*. In towns of dense traffic, or in the case of places where children make the streets their playground and are a source of worry to motormen, the wisest plan would be to insist upon a jack for each car or for alternate cars. There are two other reasons why a liberal provision would be a measure of prudence and of economy. Of late years increasing complaints are made of obstruction created by vehicles breaking down on tramway tracks and obstructing traffic. Frequently steam tractors and motor lorries figure as the cause of the blocking of the tramway track, and although all the most important undertakings have provided road motor vehicles for the conveyance of the breakdown gang, a long string of cars is sometimes held up. It is not improbable that the total mileage lost in the course of a year through the breakdown of other vehicles would suffice to pay for a number of jacks. On the other hand there are no doubt instances where if a jack were obtainable from the leading car, or from one behind it, the car crew might be able to use it for the clearance of the line. The conclusion of the war will witness an increase in the number of motor vehicles, and consequently there will be a greater risk of obstruction to tramway lines by breakdowns.

JUDGMENT REGARDING CENTRE POLES.

On December 10 Sheriff Shennan gave judgment at Hamilton in the action Henry K. Frood *v.* Lanarkshire Tramways Company. The action arose out of pursuer's motor-car colliding with an unlit centre pole in Motherwell. The Sheriff has found that pursuer's averments were irrelevant, and insufficient to support the conclusions of the initial writ, and has dismissed the action, finding the defenders entitled to expenses. The Sheriff stated that the poles were in the centre of the roadway by the authority of Parliament. They were no more a legal obstruction than were the houses in the street or the kerbs in the footway, and defenders had no duty to the public imposed on them to give warning of the existence of the poles. As to the pursuer's further contention that it was the duty of defenders to take special measures to obviate difficulties under the lighting restrictions by painting the poles white, his Lordship stated that that also was negatived. The defenders' argument was conclusive that the pursuer, being merely one of the public, had no title to found on Clause 13 of defenders' Order of 1903 an obligation to light all centre poles in Windmillhill Street. That clause was expressly described as containing certain provisions for the protection of the Provost, Magistrates and Councillors of Motherwell. Being in a private Act, it embodied a contract between the two parties to it, and no one else could enforce that contract. On the question of deficient lighting the lighting authority was responsible viz., the burgh authorities.

WELFARE ADVISOR FOR TRAMWAY WOMEN.

The shortage of men and youths has at last compelled Bristol Tramways Company to employ young women as conductors. The age limits are 18 and 25 years, and although hundreds of applications have been received, the percentage of suitable applicants is not great. Bearing in mind the development instituted by the Welfare Branch of the Ministry of Munitions in connection with Government work, Mr. Charles Challenger, the manager of the company, has engaged a woman welfare advisor for the benefit of the new class of employees. This lady assists the staff in the selection of the candidates for instruction, and throughout their career with the company she will have charge of all arrangements for their welfare. In order to secure women whose physique will be equal to the strain of car conducting, the candidates have to pass the tests imposed by the company's medical man. Directly the company engages them for a week on probation the women come under the supervision of the welfare advisor, who gives lectures on health matters, to impress upon them the need for warm clothing, neatness of attire, and the fact that strong, low-heeled boots must be worn. The welfare advisor will, in fact, act as the head of a very large family, to whom the girls can look for help and advice. During the nine hours' work per day, times are given for meals and rest, amounting in the aggregate to an hour or an hour and a half, according to the duties, and rest rooms are provided at all relief points and also at the depots. At these places the girls rest and eat their meals in comfort. Additions will be made to this scheme as soon as such arrangements are seen to be necessary by the advisor and the manager. Mr. Challenger is to be congratulated upon the completeness of the manner in which he has taken advantage of the progress that has been made in welfare work since most of the other tramway undertakings adopted women conductors. In those days tramway managers had to rely upon the help of their wives and of the wives of inspectors' assistance which was cheerfully given as a contribution to the national cause. The uniform provided for the Bristol tramway women comprises a neat blue coat and skirt, with white braid facings and white metal buttons, gaiters below the knee, and a soft felt hat encircled by a white cord band, held on by a chin strap. A white soft collar and a tie completes the uniform. For wet weather there is a mackintosh covering to the hat and a long coat. For the darkness of the tops of the cars special arrangement is made in order that the conductors may see what money they receive and give in change. The women work six days a week, for nine hours a day, and their pay is 3*s*. 6*d*. a day with 2*s*. a week war bonus.

In a reference to welfare work in Leeds as a new aid to productivity of output, the "*Yorkshire Post*" recently observed that "the Leeds Corporation tramways have now hundreds of women and girl conductors, and for their comfort special and separate accommodation has been provided at the various depots. Half-way through their duty they are relieved for half an hour (this practice, by the way, existed before), and since they have, of necessity, to leave home very early in the morning or return late at night, their discomfort has been relieved somewhat by a new privilege. Special cars are run between the depots at Headingley, Chapeltown, Bramley, and Guiseley, and points near to the centre of the city to collect the women conductors (and, properly, the men drivers, too) in the morning and return the late workers at night."

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THE SUBSTITUTION ARRANGEMENT.

Much relief is felt by tramway authorities on the publication in our last issue of the details of the substitution scheme arranged between the Secretary of State for War and the Council of the Municipal Tramways Association. We learn that in some towns a similar arrangement had been made with the military representatives at the tribunals for former tramway employees of low medical category to be returned from the army in substitution of men fit for active service. Under these local schemes the exchanges have not so far been numerous, but by the plan agreed to by Lord Derby the whole work of substitution will be on an organised basis, thus enabling a considerable number of men to be relieved. The several lists of men required by the War Office have already been forwarded from the Glasgow Tramways department. In that city there are several hundreds of motormen of military age, and the general manager expects that he will have to lose most of them to the army. In the event of an insufficient number of men who are less fit for active service being sent back from the army, there will be no way out of the difficulty except by training more women to act as drivers. There are already 200 women drivers.

APPLICATIONS TO TRIBUNALS.

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Mr. G. H. Hume, replying to questions, said that the slight difference in traffic receipts might be due to weather conditions. As to the complaints of the service in South London, the matters involved were receiving careful consideration. War conditions had seriously interfered with the various services, but early in the new year the Committee would put before the Council a series of most important proposals based on the recommendations of the sub-committee, who were considering the question of the organisation of the tramways. They were in need of more assistance as tramway administrators and they would have to ask the Council for it. The existing staff was working hard and successfully on a very difficult situation.

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CAR AND TRACK MAINTENANCE.

A number of tramway managers have reported to their committees that great difficulty exists in obtaining rails, tires, gears, pinions, axles, and other car stores material. Despite all the efforts put forward by the Tramways Associations to expedite deliveries, the outlook is a difficult one, and in view of the shortage of labour little hope of improvement can be entertained.

Owing to serious damage caused to the Liverpool Corporation cars running on the Bootle Council's track, the general manager at Liverpool has informed Bootle Council that if efforts are not made to improve the track he will have to recommend his committee to suspend the service. Bootle Council have therefore authorised the Corporation engineer to obtain a price for the supply of American rails and tenders for cutting rails. Whether rails are obtainable from America remains to be seen, as owing to the vast amount of war work in progress in that country traction companies there have experienced unprecedented difficulties in securing supplies.

Frequent breakdowns of the trolley wire have occurred at Dundee owing to the overhead equipment requiring renewal. As the delays to the traffic are expensive, the general manager has advised the committee to allow him to use the 2¼ miles of wire on the abandoned railless trolley route.

More women than men are employed in relaying the setts at worn places on the Musselburgh tramways.

MISCELLANEOUS NEWS AND NOTES.

The Light Railway Commissioners give notice that the offices of the Commission have been removed to 3, Queen Anne's Gate, Westminster.

Pontypridd Tramways.—The Urban Council at Pontypridd have decided to re-organise the tramways department, and to appoint a traffic manager in place of a superintendent.

Extensions after the War.—The list of work forwarded by Swansea Corporation to the Local Government Board as requiring to be executed on the conclusion of the war includes tramway extensions estimated to cost £54,000.

National Use of German Tramways.—By the terms of a proclamation issued in Germany on December 17 towns possessing tramways are to allocate a certain number of cars to be used for transport from the railway. Unloading parties formed of schoolboys are being formed by garrison commanders and the police.

Sale of Cranes Prohibited.—The Minister of Munitions has issued an order to the effect that no person shall until further notice sell or supply any crane except with the terms of a permit issued under the authority of the Minister of Munitions. Persons who have cranes of any kind for sale are asked to send particulars to the Ministry of Munitions.

National Work for Engineers.—At the request of a Government department the President of the Institution of Mechanical Engineers is receiving applications from assistant engineers ineligible for the forces, who would be willing to undertake work as salaried and whole-time officers. Candidates should be experienced in the values of machinery and its depreciation. The salaries range from £250, to £400 a year.

Wolverhampton Manager's Invention.—In respect of each tramcar fitted with "Silvers's dynamic pickup," the Wolverhampton Corporation Tramways Committee recommend that a royalty of £15 be paid to the general manager and engineer, Mr. C. Owen Silvers, provided that the Corporation shall have the option at any time of fitting any number of cars with such apparatus for the sum of £750, less such amounts already paid.

Roadmakers for France.—Mr. Martin, borough engineer of Salford, has left for France to join the roadmakers' battalions, which will work under the direction of Brigadier-General H. P. Maybury, the Road Board's engineer and manager. Mr. Martin has the rank of major. An appeal has been made to local authorities for plant as well as for officers and men, and it is meeting with a first-rate response. One hundred employees of Salford Council have offered their services.

Permanent Way Control at Bradford.—Provided the scheme receives the sanction of the City Council, an arrangement has been made by the Tramways Committee and the Finance and General Purposes Committee to transfer the control of the permanent way work from the city engineer to the general manager of the tramways. The staff and workmen employed on the permanent way have always been part of the tramway organisation, and have received their pay from that department.

Electro-Magnetic Route Indicator.—Further particulars are available concerning the experiment by Mr. C. N. Mallins, the general manager at Liverpool, with a gramophone arrangement to announce the names of stopping places. When the car approaches a stopping place the cover of a cabinet in the saloon swings open and discloses the name of the street, at the same time a gramophone appliance calls out the name. Simultaneously a bell rings to call the attention of passengers to the announcement. Mr. Mallins reports that the experiment has been entirely successful and as fast as the electric parts of the appliance can be secured it will be placed in every car.

Full Services at Birmingham.—On December 18, Mr. Alfred Baker the general manager, issued the following notice to the public:—"The Electric Supply Department having installed additional machinery, it is anticipated that from this date the tramway services will be fully maintained." Since the first serious stoppage in the middle of October the restriction of the service has entailed a loss of about £30,000. The Chairman of the Tramways Committee has stated that even when the full service is running there is a decrease of £300 to £400 a day, owing to the confidence of the public in the reliability of the service having been shaken. On December 20 there was a stoppage of several hours, due to the bursting of a steam pipe at the generating station.

Higher Railway Fares and Reduced Services.—Mr. G. H. Roberts announced in the House of Commons on December 20 that a large reduction in the number of passengers on the railways was necessary to enable the railway companies to cope with other demands both here and in France. The passenger services would therefore be restricted on and after January 1, and there would be an increase in the ordinary passenger fares from that date of 50 per cent. Workmen's fares and season tickets for a distance not exceeding forty miles would not be altered. Notices have been issued by various companies foreshadowing great reductions in the services and the closing of numerous stations.

Workmanship of the C.A.V. Lighting Sets.—When a Mex Motor Spirit lorry through skidding ran into the bridge at Bransford, near Worcester, at mid-day on November 27, and was precipitated into 16 feet of water, it was not until five in the evening of December 1 that it was got on to the bridge again. One of the engineers of the Bowring Petroleum Co., Ltd., who was in charge of the operations turned on the switch and, much to his surprise, found the lighting set intact and in perfect working order, nor has it required any attention since, although it has remained in frequent use. This is a striking instance of the excellence of design and workmanship of the C.A.V. lighting set for heavy vehicles and shows that the waterproof qualities and insulation of this famous system are practically perfect. Mr. Chas. A Mott, the Birmingham and Midland manager for the Bowring Petroleum Co., vouches for the above remarkable facts.

Lost Mileage.—Fogs of varying intensity visited the Midlands during the first half of December, the climax being reached on Saturday evening last. In Manchester, Salford and Oldham, tramway and railway traffic was curtailed, many drivers of tramcars giving up when they reached a depot. Apart from last Saturday's experience the general manager at Oldham reported to the Tramways Committee on December 14 that since their last meeting the bad weather and fog had caused the drivers to lose 350 car miles, and with a shortage of men due to sickness, etc., they had lost 105 miles. Motor vehicles breaking down on the track led to the loss of 25 miles, and 16 miles were lost owing to a fire in High Street. The following accidents had occurred: Eight persons alighting or boarding cars whilst in motion, ten cars in collision with other vehicles, two cars in collision, and one person knocked down by a car. In the works department he had been seriously handicapped through the shortage of men, and had at the moment 11 men on the sick list, including the car shed foreman.

Two Days' Strike over Women Inspectors.—At Salford on December 17 and 18 the men and women tramway employees left their work because Mr. G. W. Holford, the general manager, had promoted eight of the women conductors to inspectorships. As they were only to supervise the women conductors their wages were fixed at 30*s.* a week. The men inspectors receive 40*s.* or over, for they have to be qualified to drive a car, to effect running repairs and to control traffic. The men contended that women who had been in the service for less than a year should not be promoted over the heads of men who had been on the cars for years. The general manager communicated with Alderman Jackson, the general secretary of the Tramway and Vehicle Workers' Association, and on Sunday a deputation of the men requested the Tramways Committee to withdraw the women inspectors as a preliminary to negotiations. This course was agreed to. Then the objection was raised that reference of the matter to the Committee on Production would entail delay. To obviate that contingency both parties agreed to accept the stipendiary magistrate as arbitrator. That gentleman at once went to the depot, but a meeting of the employees repudiated the action of their delegates and insisted on the unconditional withdrawal of the women inspectors. During the second day's cessation of the services, the chairman of the Tramways Committee and the general manager attended the Manchester office of the Ministry of Munitions, and the representative (Mr. Higson) offered to talk with the employees. As a result of conferences the committee decided to withdraw the female inspectors from the cars pending the decision by the arbitrators as to whether women should be employed and their rate of wages.

Concessions to Employees.—An additional war allowance, estimated at £15,120 per annum, has been granted to the Sheffield Corporation Tramway employees, thus increasing the estimated cost of war allowances to £30,619 per year. An agreement has been reached concerning the request made by the Bradford tramway workers for a penny per hour increase. At a meeting on December 18 the Tramway Committee decided that all drivers who have not received an advance since the war be granted ¾*d.* per hour, and that all other male employees of the traffic staff be granted ½*d.* per hour advance, irrespective of scale advances, as a war wage due to and consequent on the increase in the cost of living. Overtime is to be paid for at the rate of time and a half. Arbitration took place in London on December 21 before the Committee on Production on the application of the motormen of Accrington, Rochdale, and other Corporation tramways for an increase from 7½*d.* to 8*d.* per hour. As part of the programme of the Lancashire and Cheshire federation of tramway workers, the Southport employees have obtained the following increases:—Motormen, on appointment, from 6*d.* to 6½*d.* per hour; after 1,000 hours 6½*d.* to 6¾*d.*; after a further year, 6¾*d.* to 7*d.*; after a second year 7½*d.* Conductors 4½*d.* to 5*d.*, after 1,000 hours 5*d.* to 5½*d.*, after a further year 5½*d.* to 5¾*d.*, after a second year 6*d.* For youths and women conductors the rates for the same periods are 4½*d.*, 5*d.*, 5½*d.*, and 5¾*d.* The rates asked for on behalf of adult employees were fixed by the Lancashire and District meeting in May, namely, 7*d.* (minimum), and 8*d.* (maximum), per hour for motormen, and 6*d.* (minimum), and 7*d.* (maximum) for conductors. South Shields Council have increased the married tramwaymen's war bonus from 3*s.* to 6*s.* per week, and for single men from 2*s.* 6*d.* to 4*s.*

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THE SUBSTITUTION ARRANGEMENT.

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CAR AND TRACK MAINTENANCE.

A number of tramway managers have reported to their committees that great difficulty exists in obtaining rails, tires, gears, pinions, axles, and other car stores material. Despite all the efforts put forward by the Tramways Associations to expedite deliveries, the outlook is a difficult one, and in view of the shortage of labour little hope of improvement can be entertained.

Owing to serious damage caused to the Liverpool Corporation cars running on the Bootle Council's track, the general manager at Liverpool has informed Bootle Council that if efforts are not made to improve the track he will have to recommend his committee to suspend the service. Bootle Council have therefore authorised the Corporation engineer to obtain a price for the supply of American rails and tenders for cutting rails. Whether rails are obtainable from America remains to be seen, as owing to the vast amount of war work in progress in that country traction companies there have experienced unprecedented difficulties in securing supplies.

Frequent breakdowns of the trolley wire have occurred at Dundee owing to the overhead equipment requiring renewal. As the delays to the traffic are expensive, the general manager has advised the committee to allow him to use the 2¼ miles of wire on the abandoned railless trolley route.

More women than men are employed in relaying the setts at worn places on the Musselburgh tramways.

MISCELLANEOUS NEWS AND NOTES.

The Light Railway Commissioners give notice that the offices of the Commission have been removed to 3, Queen Anne's Gate, Westminster.

Pontypridd Tramways.—The Urban Council at Pontypridd have decided to re-organise the tramways department, and to appoint a traffic manager in place of a superintendent.

Extensions after the War.—The list of work forwarded by Swansea Corporation to the Local Government Board as requiring to be executed on the conclusion of the war includes tramway extensions estimated to cost £54,000.

National Use of German Tramways.—By the terms of a proclamation issued in Germany on December 17 towns possessing tramways are to allocate a certain number of cars to be used for transport from the railway. Unloading parties formed of schoolboys are being formed by garrison commanders and the police.

Sale of Cranes Prohibited.—The Minister of Munitions has issued an order to the effect that no person shall until further notice sell or supply any crane except with the terms of a permit issued under the authority of the Minister of Munitions. Persons who have cranes of any kind for sale are asked to send particulars to the Ministry of Munitions.

National Work for Engineers.—At the request of a Government department the President of the Institution of Mechanical Engineers is receiving applications from assistant engineers ineligible for the forces, who would be willing to undertake work as salaried and whole-time officers. Candidates should be experienced in the values of machinery and its depreciation. The salaries range from £250, to £400 a year.

Wolverhampton Manager's Invention.—In respect of each tramcar fitted with "Silvers's dynamic pickup," the Wolverhampton Corporation Tramways Committee recommend that a royalty of £15 be paid to the general manager and engineer, Mr. C. Owen Silvers, provided that the Corporation shall have the option at any time of fitting any number of cars with such apparatus for the sum of £750, less such amounts already paid.

Roadmakers for France.—Mr. Martin, borough engineer of Salford, has left for France to join the roadmakers' battalions, which will work under the direction of Brigadier-General H. P. Maybury, the Road Board's engineer and manager. Mr. Martin has the rank of major. An appeal has been made to local authorities for plant as well as for officers and men, and it is meeting with a first-rate response. One hundred employees of Salford Council have offered their services.

Permanent Way Control at Bradford.—Provided the scheme receives the sanction of the City Council, an arrangement has been made by the Tramways Committee and the Finance and General Purposes Committee to transfer the control of the permanent way work from the city engineer to the general manager of the tramways. The staff and workmen employed on the permanent way have always been part of the tramway organisation, and have received their pay from that department.

Electro-Magnetic Route Indicator.—Further particulars are available concerning the experiment by Mr. C. N. Mallins, the general manager at Liverpool, with a gramophone arrangement to announce the names of stopping places. When the car approaches a stopping place the cover of a cabinet in the saloon swings open and discloses the name of the street, at the same time a gramophone appliance calls out the name. Simultaneously a bell rings to call the attention of passengers to the announcement. Mr. Mallins reports that the experiment has been entirely successful and as fast as the electric parts of the appliance can be secured it will be placed in every car.

Full Services at Birmingham.—On December 18, Mr. Alfred Baker the general manager, issued the following notice to the public:—"The Electric Supply Department having installed additional machinery, it is anticipated that from this date the tramway services will be fully maintained." Since the first serious stoppage in the middle of October the restriction of the service has entailed a loss of about £30,000. The Chairman of the Tramways Committee has stated that even when the full service is running there is a decrease of £300 to £400 a day, owing to the confidence of the public in the reliability of the service having been shaken. On December 20 there was a stoppage of several hours, due to the bursting of a steam pipe at the generating station.

Higher Railway Fares and Reduced Services.—Mr. G. H. Roberts announced in the House of Commons on December 20 that a large reduction in the number of passengers on the railways was necessary to enable the railway companies to cope with other demands both here and in France. The passenger services would therefore be restricted on and after January 1, and there would be an increase in the ordinary passenger fares from that date of 50 per cent. Workmen's fares and season tickets for a distance not exceeding forty miles would not be altered. Notices have been issued by various companies foreshadowing great reductions in the services and the closing of numerous stations.

Workmanship of the C.A.V. Lighting Sets.—When a Mex Motor Spirit lorry through skidding ran into the bridge at Bransford, near Worcester, at mid-day on November 27, and was precipitated into 16 feet of water, it was not until five in the evening of December 1 that it was got on to the bridge again. One of the engineers of the Bowring Petroleum Co., Ltd., who was in charge of the operations turned on the switch and, much to his surprise, found the lighting set intact and in perfect working order, nor has it required any attention since, although it has remained in frequent use. This is a striking instance of the excellence of design and workmanship of the C.A.V. lighting set for heavy vehicles and shows that the waterproof qualities and insulation of this famous system are practically perfect. Mr. Chas. A Mott, the Birmingham and Midland manager for the Bowring Petroleum Co., vouches for the above remarkable facts.

Lost Mileage.—Fogs of varying intensity visited the Midlands during the first half of December, the climax being reached on Saturday evening last. In Manchester, Salford and Oldham, tramway and railway traffic was curtailed, many drivers of tramcars giving up when they reached a depot. Apart from last Saturday's experience the general manager at Oldham reported to the Tramways Committee on December 14 that since their last meeting the bad weather and fog had caused the drivers to lose 350 car miles, and with a shortage of men due to sickness, etc., they had lost 105 miles. Motor vehicles breaking down on the track led to the loss of 25 miles, and 16 miles were lost owing to a fire in High Street. The following accidents had occurred: Eight persons alighting or boarding cars whilst in motion, ten cars in collision with other vehicles, two cars in collision, and one person knocked down by a car. In the works department he had been seriously handicapped through the shortage of men, and had at the moment 11 men on the sick list, including the car shed foreman.

Two Days' Strike over Women Inspectors.—At Salford on December 17 and 18 the men and women tramway employees left their work because Mr. G. W. Holford, the general manager, had promoted eight of the women conductors to inspectorships. As they were only to supervise the women conductors their wages were fixed at 30s. a week. The men inspectors receive 40s. or over, for they have to be qualified to drive a car, to effect running repairs and to control traffic. The men contended that women who had been in the service for less than a year should not be promoted over the heads of men who had been on the cars for years. The general manager communicated with Alderman Jackson, the general secretary of the Tramway and Vehicle Workers' Association, and on Sunday a deputation of the men requested the Tramways Committee to withdraw the women inspectors as a preliminary to negotiations. This course was agreed to. Then the objection was raised that reference of the matter to the Committee on Production would entail delay. To obviate that contingency both parties agreed to accept the stipendiary magistrate as arbitrator. That gentleman at once went to the depot, but a meeting of the employees repudiated the action of their delegates and insisted on the unconditional withdrawal of the women inspectors. During the second day's cessation of the services, the chairman of the Tramways Committee and the general manager attended the Manchester office of the Ministry of Munitions, and the representative (Mr. Higson) offered to talk with the employees. As a result of conferences the committee decided to withdraw the female inspectors from the cars pending the decision by the arbitrators as to whether women should be employed and their rate of wages.

Concessions to Employees.—An additional war allowance, estimated at £15,120 per annum, has been granted to the Sheffield Corporation Tramway employees, thus increasing the estimated cost of war allowances to £30,619 per year. An agreement has been reached concerning the request made by the Bradford tramway workers for a penny per hour increase. At a meeting on December 18 the Tramway Committee decided that all drivers who have not received an advance since the war be granted ¾*d.* per hour, and that all other male employees of the traffic staff be granted ½*d.* per hour advance, irrespective of scale advances, as a war wage due to and consequent on the increase in the cost of living. Overtime is to be paid for at the rate of time and a half. Arbitration took place in London on December 21 before the Committee on Production on the application of the motormen of Accrington, Rochdale, and other Corporation tramways for an increase from 7½*d.* to 8*d.* per hour. As part of the programme of the Lancashire and Cheshire federation of tramway workers, the Southport employees have obtained the following increases:—Motormen, on appointment, from 6*d.* to 6½*d.* per hour; after 1,000 hours 6½*d.* to 6¾*d.*; after a further year, 6¾*d.* to 7*d.*; after a second year 7½*d.* Conductors 4½*d.* to 5*d.*, after 1,000 hours 5*d.* to 5½*d.*, after a further year 5½*d.* to 5¾*d.*, after a second year 6*d.* For youths and women conductors the rates for the same periods are 4½*d.*, 5*d.*, 5½*d.*, and 5¾*d.* The rates asked for on behalf of adult employees were fixed by the Lancashire and District meeting in May, namely, 7*d.* (minimum), and 8*d.* (maximum), per hour for motormen, and 6*d.* (minimum), and 7*d.* (maximum) for conductors. South Shields Council have increased the married tramwaymen's war bonus from 3*s.* to 6*s.* per week, and for single men from 2*s.* 6*d.* to 4*s.*

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PERSONAL.

Sir Alfred Mond, the new First Commissioner of Works in Mr. Lloyd George's Ministry, is chairman of the Power Gas Corporation and Mond Nickel Company, and a director of Brunner, Mond and Company.

Sir J. Baxter Ellis, a former chairman of Newcastle Tramways Committee has been attacked by a serious illness but at the December meeting of the Corporation the Lord Mayor announced that he was rapidly recovering.

Mr. A. W. Johnson, who has been in the service of the London County Council since June 1, 1908, has been appointed a charge shift engineer at Greenwich generating station at a salary of £250 a year, rising by annual increments of £10 to £300.

Captain H. Garrett, borough surveyor of Torquay, and Royal Engineers (T.F.), who for the past two years has held the position of chief engineer of the northern section of the Plymouth Garrison, has been appointed roads and communication officer for the whole of the Southern Command.

Mr. E. Eastwood, who for eleven years has had charge of the electrical repair shops of the London County Council Tramways at the central repair depot, has resigned that position and has accepted the post of manager for the Electrical Repair Company, Martin's Yard, Endwell Road, Brockley, S.E. The company are specialising in all types of armature and field coil winding and repairs.

Mr. Neville Chamberlain, Lord Mayor of Birmingham, has been appointed by the Prime Minister as Director-General for the organisation of the whole of the labour of the country for war work. As the first step, an appeal will be made to men between 16 and 60 years of age to enrol. Mr. Chamberlain, who is resigning his position as Lord Mayor, took a leading part in inducing the Corporation to acquire the motor omnibus service of the city. He is a director of the Small Arms Company, in which is included the Daimler Motor Company.

Edinburgh Tramwaymen's War Honours.—Sir Robert Maule, who presided at an annual concert held recently in aid of the Tramways Employees' Widows and Orphans' Fund, stated that over 600 of the men had joined the colours, most of them voluntarily. The D.C.M. had been awarded to Conductor W. Borthwick, Driver John S. Smith, Driver W. M'Lennan, and Donald Hunt, of the engineers' staff. Corporal Bathgate, who had been with them back in the days of the horse cars, had been wounded three times, and had passed through fourteen important battles. They were heroes all. When one thought of what such men had done for the Empire the heart thrilled at their courage and devotion to duty.

Sir Albert Stanley, the new President of the Board of Trade, was on December 20 adopted as candidate for the vacancy created at Ashton-under-Lyne. In an interview Sir Albert said that he was going to the Board of Trade simply as a business man to do what he could to assist in winning the war. He did not intend to spend a great deal of time in Parliament, and would devote practically all his efforts to the conduct of the Board of Trade. In the House of Commons on December 18 the Government obtained power to appoint additional Under-Secretaries for several departments. Mr. Bonar Law stated that it had not been decided whether or not an additional Under-Secretary would be appointed to the Board of Trade, but the reason the Government asked for the power was that Sir Albert Stanley had been appointed President, not because of any Parliamentary gifts, though, as a matter of fact having heard him, he thought Sir Albert could explain his case as well as most old-time politicians, but he did not want to do it. He had gone to the Board of Trade to do work (hear, hear), and not to defend what he did in the House of Commons. But Sir Albert suggested that probably an additional Parliamentary Under-Secretary would free his hand and enable him to do the work. Sir Albert Stanley has appointed Mr. R. W. Matthew and Mr. E. R. Eddison his private secretaries.

CONTRACTS AND ORDERS.

Newport Council have allotted contracts for converting plant to the British Westinghouse Company, Ltd.

Hadfield's, Ltd., have a contract to supply twelve sets of manganese steel points to Sheffield Corporation Tramways.

Launceston Council, Tasmania, have allotted a contract for the supply of 26 transformers to the General Electric Company, London.

The British Thomson-Houston Company have received orders for switchgear from Newport, Walsall, and Wolverhampton Corporations.

Shepherd's Parging Block Company, Ltd., have received a further order from Salford Corporation Tramways for a large quantity of parging blocks.

Contracts for Transformers have been awarded by Sheffield Electricity Committee to Ferranti, Ltd., and the Brush Electrical Engineering Company.

Dennis Bros., Ltd., have a contract to supply a 75 h.p. motor turbine fire engine with 55 ft. lattice girder fire escape to Bradford Corporation, at £1,300.

Manchester Corporation have given contracts for the supply of cable to the Pirello-General Cable Works, Western Electric Company, W. T. Glover and Co., and British Insulated and Helsby Cables.

Sheffield Tramways Committee have recommended the Corporation to accept the tender of the Brush Electrical Engineering Company, Ltd., for the supply of 28 double-deck top-covered cars without electrical equipment, at £1,060 per car, plus 5 per cent. for contingencies. For the electricity department the Electricity Committee have placed the following contracts:—12 oil break furnace switches and 30 panels of sub-station switchgear, A. Reyrolle and Co.

Battery Vehicles.—An order for an Orwell electric lorry of 2½ ton capacity has been placed by Wolverhampton Council with Messrs. Ransomes, Sims and Jefferies. A sub-committee of Bolton Electricity Committee, besides (as already reported) considering the advisability of acquiring an electrically propelled vehicle for the use of the department, are also empowered to confer with the several committee of the Corporation, using horse or other vehicles as to the desirability of substituting electrical vehicles.

FINANCIAL REPORTS AND MEETINGS.

East London Railway.—The directors have made a distribution of 8s. 9d. per cent., less tax, on the "B" debenture stock for the year.

Manila Electric Railroad and Lighting.—This company announce a dividend of 1½d. per cent. (1.50 dols. per share) for the quarter to December 31, 1916, on the common stock.

Blackpool, St. Annes and Lytham Tramways. The directors propose to pay 5 per cent. on the debenture stock on account of arrears. In 1915 4 per cent. per annum was paid on this stock, and in 1914 there was no payment.

L.C.C. Traffic Receipts.—The receipts for the week ended December 6, 1916, were £44,565, a decrease of £357 as compared with the corresponding period last year. The number of passengers was 10,703,044, an increase of 9,266. From April 1 to December 6 (35½ weeks) the total receipts were £1,729,004, an increase of £154,254 on the corresponding period of 1915. The route mileage was 141.67.

British Columbia Electric Railway Company.—After setting aside for renewals £102,236, and for income tax £10,000, and adding to capital amortisation fund £2,655, the net revenue for the year ended June 30 amounted to £134,964, making, with the balance brought forward and £70,000 transferred from the reserve fund, £211,630. Debenture interest and dividends on 5 per cent. preference stock absorbed £204,771, leaving £6,859 to carry forward.

Messrs. Dick, Kerr and Co., Ltd., as already briefly reported, have issued a circular to the shareholders in which they offer to acquire the preference and ordinary shares of the United Electric Car Company, Preston. A circular sent out by the directors of the latter company recommends the acceptance of the terms. For each preference share it is proposed to give one 6 per cent. cumulative preference share of £1 (fully paid) in Dick, Kerr & Co., the preference shares in Dick, Kerr & Co. given in exchange to rank for the full six months' dividend payable on April 1, 1917, or, in the alternative, they will pay 20s. cash. For ordinary shares the price will be 15s. in cash for each ordinary share. The directors (other than Mr. Prestwich, who is vice-chairman of Dick, Kerr & Co.) have agreed to transfer the shares held by them on the above terms. The directors (other than Mr. Prestwich) will retire from the board, and the shareholders will be invited to appoint a new board in their place, consisting of persons to be proposed by Dick, Kerr & Co., who have agreed to pay £3,000 to the directors retiring as compensation for loss of office. The United Electric Car Company was formed in 1898, and has a share capital of £250,000, of which sum £150,000 is in ordinary shares. For the past two years only the dividends were paid on the 6 per cent. preference shares, but the ordinary shares received 5 per cent. in 1911-12, 1912-13, and 1913-14.

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-four of the principal tramway undertakings in the United Kingdom for the week ended December 9, give total receipts of £171,583 or £5,528 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or sixty-six more than for the corresponding week. The receipts this year were at the rate of £76 18s. 10d. per mile of single track, and last year at the rate of £76 15s. 5d., thus showing an increase for the week of 3s. 5d. per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

The decrease in the receipts for the week compared with the increase of £15,042 for the previous week this year is mainly attributable to a falling off in the case of the Birmingham Corporation tramways of nearly £2,000 due to the stoppage of traffic owing to the continued inability of the electric supply department to supply energy. The largest increase for the week in the case of any undertaking was that for Glasgow, where there was an increase of £2,117. In regard to most of the other undertakings the increase for the week is considerably less than it has been in recent weeks, but in only a few was there any decrease.

DICK, KERR & Co.,
Limited,
ABCHURCH YARD, CANNON STREET,
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ENGINEERS & CONTRACTORS.
Complete Equipment
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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

Dividends. Prev.	Dividends. Last.	Name.	Paid.	Price, July 27 1914	Cash. Dec 21.	A Week Ago.
5%	5%	Alabama Traction. 5% 1st. Mt.	—	67	76½	76⅜
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4¼	57/6	62/6
4%	4%	Do. 4% Deb. ...	100	91	65½	66½
4½%	4½%	Do. 4½% Deb. ...	100	98½	74	74
5%	5%	Do. 5% Deb. ...	100	96	62	61½
7d.	1/-	Auckland Elec. Trams. Ord. ...	1	1⅝	21/-	21/-
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	93⅜	93⅜
6/-	6/-	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11⅜	10½	10½
4½%	4½%	Do. 4½% Deb....	100	96	82	82½
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	91½	91½
$¼	$1	Brazilian Trac. & Power Ord. ...	$100	66	48	46½
$1½	$1½	Do. 6% Cum. Pref.	$100	97	84⅜	84
4/-	4/-	Brisbane Elec. Trams. Old. ...	5	7½	6⅜	6½
2/6	2/6	Do. 5% Cum. Pref.	5	5	77/6	77/6
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92½	92½
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	35	46
6%	5%	Do. Pref. Ord....	100	106	41	47½
5%	5%	Do. 5% Cum. Pref.	100	103	66	66
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	87	87
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	60½	60⅞
—	£3*	Brit. Elec. Trac. Ord.	100	—	34	34⅜
6%	6%	Do. 6% Cum. Part Pref. ...	100	—	74	74¼xd
5%	5%	Do. 5% Deb.	100	92	80	80
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	69⅜	69⅜
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	79⅜	79⅜
6/6	3/-	Calcutta Tramways, Ord. ...	5	7½	7 1/16	6⅝
1/3	1/3	City of B.A. Trams.	5	5½	81/-	85/-
5/-	4/-	Dublin United Trys 6% Pref.	10	12	10½	10 1/16
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79¾xd	79¾xd
2/6	3/-	Isle of Thanet 5% Pref. ...	5	2½	27/6	27/6
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅜	2/1½	2/1½
6/-	6/6	Lanarkshire Trys. Co.	10	10½	9 9/16	9 9/16
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9d.*	9d.*	Llandudno & Colwyn B. Ord. ...	1	—	9/10½	9/10½
—	1½d.	Lond. & Sub. Traction Ord. ...	1	15/16	1/10½	2/4½
6d.	6d.	Do. 5% Pref.	1	7/16	8/4½	7/10½
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	66	64
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88	88
5%	5%	Do. 5% Inc. Deb.	100	88½	78⅜	78⅜
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	45	45
3/-	3/-	Madras Elec. 6% Pref. ...	5	5 1/16	96/6	96/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	66⅜	66⅜
$1¼	$1¼	Manila Elec. R. R. & Light ...	$100	102	67½	67½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	74½	74½
$1¼	$1¼	Mexico Trams. Common ...	$100	70	22	22⅝
5%	5%	Do. 1 Mt. 5% G.B.	—	84	30	30
6%	6%	Do. 6% Mt. Bds.	100	76	25½	30
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs.	100	99	95	95
1/-*	1/2½*	National Steam Car	1	⅜	22/-	20/6
9d.*	9d.*	New General Traction	1	⅜	7/9½	7/9½
8d.	6d.	Northern Gen. Trans. Ord. ...	1	⅜	13/9	13/9
6/-*	5/-*	Para Elec. Rlys. Ord.	5	4½	68/-	68/-
5%	5%	Do. 5% 1st Deb.	100	80½	75½	74½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80⅜	80⅜
6d.*	7½d.*	Potteries Elec. Tram. 5% Pref.	1	⅜	11/-	11/-
8d.	1/4	Provincial Trams. Ord.	1	⅜	20/6	20/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	91½	91½
5%	5%	1st. Mt. 5% 50 yr.	100	89½	74½	74½
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	88⅜	88⅜
5%	5%	Do. 5% Perp. Deb.	100	99½	77¼	77¼
—	3d.	Singapore Elec. Trams	5/-	½	4/10½	4/10½
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	94	94
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	81	81
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	97½	97½
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	77	77
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅜	9/3	9/5
3/-	3/-	Do. 6% Cum. Pref.	5	⅜	95/-	94/3
—	—	Metropolitan Dist. Ord. ...	100	—	16½	15½
—	—	Undgd. Elec. Rys. of London ...	10	2½	4/3	39/6
		Do. "A"	1/-	—	6/3	5/10½
4½	4½	Do. 4½% Bds of 1933 Rd.	—	90½	101	100½
6	6	Do. 6% 1st Cum. In. Db.	100	111	100½	101
6	6	Do. 6% In. Bonds Rd. ...	—	88	92 7/16	91⅜

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or Month.	Latest Return. 1915	Latest Return. 1916	Aggregate. Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	Dec. 16	£51,874	£53,833	51	£2,561,219	+ £6,196
Auckland.....(28 days)	Nov. 20	20,910	20,729	20	105,015	+ 979
Ballarat and Bendigo ...	Oct. 8	3,401	3,390	28	22,110	+ 600
Brazilian Traction Mlrs.	Oct.	6,793,000	7,037,000	44	68,286,000	+4,035,890
Brisbane	Nov.	31,120	26,740	48	357,160	+ 10,086
British Columbia.....$	Oct.	538,826	573,544	18	2,202,570	+ 128,873
Buenos Aires Lacroze ...	Nov.	46,033	42,603	22	207,402	— 16,614
Burmah Tram.&LightRs.	Nov.	23,695	26,824	18	104,753	+ 8,205
Calcutta.....Rs.	Dec. 9	67,263	72,671	50	3,348,996	+ 183,423
Cape Town	Oct.	...	14,238	...	...	...
Carthagena & Herrerias..	Nov.	2,090	2,252	48	27,391	+ 7,552
Cordoba	Oct.	13,441	13,533	31	98,087	+ 740
Costa Rica	July	3,046	3,223	...	...	...
East India	Nov.	2,065	1,942	17	9,067	+ 613
Hong Kong .....$	Nov. 11	11,212	13,225	48	650,200	+ 154,781
Kalgoorlie	Sept.	2,997	2,788	39	23,267	— 1,849
La Plata	Nov.	4,564	4,342	48	46,399	— 429
Lima	Oct.	32,211	33,292	44	337,350	+ 16,858
Lisbon .....Escu.	Oct.	...	203,955	...	...	...
Madras .....(2 weeks)	Nov. 30	25,837	29,664	47	695,170	+ 51,009
Manila	July	23,750	33,700	31	887,739	+ 39,986
Manaos .....Rs.	Oct.	...	150,275	...	...	...
Melbourne	May	...	69,275	...	...	...
Montevideo	Nov.	28,407	28,404	4	28,404	— 3
Pernambuco	Dec. 17	2,973	3,550	50½	155,050	+ 473
Peruvian .....$	Nov.	751,720	925,820	22	4,514,650	+ 656,873
Port Elizabeth	Oct.	...	3,131	...	...	...
Rangoon	Nov.	5,028	5,033	48	51,404	— 1,839
Shanghai .....$	Nov. 15	28,278	33,992	...	...	...
Singapore .....$	Nov. 11	12,020	12,814	44	568,474	+ 56,886
Toronto.....$	Oct.	792,001	907,460	44	8,913,224	+ 970,618
Winnipeg	Oct.	286,146	278,817	44	2,740,271	— 59,324

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	Latest Return. 1916	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Aggregate. Incr. or Dec.
Aberdare U.D.C.	Dec. 6	£363	£393	+ 30	36	£14,309	+ £1,645
Aberdeen Corporation...	,, 13	1,670	1,787	+ 117	28	54,126	+ 3,292
Accrington Corp.	Nov. 29	498	520	+ 22	38	20,419	+ 860
Ayr Corporation	Dec. 16	237	249	+ 12	31	13,744	+ 1,213
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	,, 17	1,378	1,400	+ 22	37½	57,771	+ 5,990
Birmingham Corp.	,, 9	15,846	13,850	— 1,996	36	578,042	+ 57,687
Do. Motor Omnibuses	,, 9	814	905	+ 91	36	36,476	+ 5,332
Blackburn Corp.	,, 13	1,026	1,022	+ 4	37⅔	47,233	— 921
Blackpool & Fleetwood.	Nov. 25	247	284	+ 37	47	42,411	+ 4,809
Blackpool Corp.	*	...	...	...	...	...	...
Bolton Corporation	Dec. 17	2,606	2,693	+ 87	38	109,091	+ 7,844
Bournemouth Corp.	,, 20	1,904	1,756	— 148	38	88,442	— 6,726
Bradford Corporation ...	,, 16	6,530	6,950	+ 420	37	255,182	+ 9,969
Brighton Corporation ...	,, 17	850	946	+ 96	37⅔	47,275	+ 5,265
Bristol	,, 16	10,122	9,484	— 638	50	503,919	+ 22,829
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation	,, 16	1,526	1,544	+ 18	38	64,710	+ 3,692
Burton-on-Trent Corp...	,, 17	271	262	— 9	37	10,348	— 548
Bury Corporation	,, 17	1,216	1,139	— 77	37⅔	53,664	+ 2,450
Cardiff Corporation	Nov. 25	2,388	2,871	+ 483	34	104,246	+ 10,516
Chatham & District.....	Dec. 14	1,039	1,078	+ 39	50	61,340	+ 3,423
Chesterfield Corp.	,, 14	262	238	— 76	37	10,299	+ 245
Colne Corporation	Nov. 25	210	240	+ 30	...	...	...
Cork Electric	Dec. 14	432	445	+ 13	50	25,491	+ 530
Croydon Corporation ...	*	...	...	...	...	...	...
Derby Corporation	,, 16	988	996	+ 8	37½	42,364	+ 2,873
Dover Corporation	*	...	...	...	...	...	...
Dublin & Lucan	,, 15	105	107	+ 2	24	3,924	+ 332
Dublin United	,, 15	5,714	5,973	+ 259	50	304,680	+ 1,932
Dundee City	,, 13	1,264	1,279	+ 15	30⅔	42,483	+ 1,047
East Ham Corporation	,, 16	1,343	1,090	— 253	37½	48,622	— 277
Exeter Corporation	,, 15	321	341	+ 20	37	15,156	+ 898
Glasgow Corporation	,, 16	21,807	22,706	+ 899	28⅔	668,882	+ 52,329
Glasgow Subway	,, 19	1,276	1,356	+ 80	50	58,025	+ 4,461
Glossop (U. Elec. Supp.)	,, 16	123	124	+ 1	51	7,073	+ 685
Halifax Corporation	,, 5	1,772	1,865	+ 93	35⅓	80,792	+ 1,112
Do. Motor Omnibuses	,, 5	39	44	+ 5	35⅓	1,787	— 4
Hastings & District	,, 15	721	840	+ 119	50	51,783	+ 3,633
Huddersfield Corp.	,, 16	2,437	2,546	+ 109	37	105,785	+ 8,940
Hull Corporation	,, 16	3,176	3,165	— 11	37	116,835	+ 1,729
Ilford U.D.C.	,, 16	617	582	— 36	37	25,427	+ 1,285
Ilkeston Corporation ...	*	...	...	...	...	...	...
Ipswich Corporation	,, 16	467	394	— 73	37	19,339	— 1,278
Isle of Thanet	,, 16	217	222	— 5	11	2,942	— 42
Kilmarnock Corp.	,, 16	153	156	+ 3	30⅔	5,428	+ 201
Lanarkshire	,, 7	1,862	2,111	+ 249	49	113,298	+ 16,342
Lancashire United	,, 13	1,519	1,612	+ 93	50	91,431	+ 5,460
Leeds City	,, 16	8,641	9,257	+ 616	38	367,345	+ 33,518
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	,, 16	706	793	+ 87	30⅔	27,138	+ 3,449
Leyton U.D.C.	,, 14	1,521	1,453	— 68	37	61,601	+ 943
Liverpool Corporation...	,, 9	13,382	13,951	+ 569	49½	694,171	+ 39,686
Llandudno & Colwyn B.	,, 15	206	211	+ 5	2½	398	+ 24
London County Council	,, 6	44,922	44,565	— 357	35½	1,729,904	+ 154,254
London Genl. Omnibus	*	...	...	...	...	...	...
London United	*	...	...	...	...	...	...
Lowestoft Corporation...	*	...	...	...	...	...	...
Maidstone Corporation..	,, 14	186	175	— 11	37	8,147	— 95
Manchester Corp.	,, 16	17,706	16,594	+ 1,112	35	702,067	+ 37,726
Met. Elec. Trys.	*	...	...	...	...	...	...
National Steam Car.....	*	...	...	...	...	...	...
Nelson Corporation	,, 16	174	179	+ 5	37½	7,934	+ 595
N'castle-on-Tyne Corp.	,, 16	5,778	6,658	+ 880	37	250,709	+ 16,855
Newport (Mon.) Corp....	,, 16	818	892	+ 74	37	35,905	+ 4,325
New St. Helens & Dist.	,, 13	906	947	+ 41	24	27,283	+ 2,178
Northampton Corp.	,, 8	652	670	+ 18	36	25,975	— 631
Nottingham Corp.	,, 14	3,580	3,661	+ 81	37	145,798	+ 6,667
Oldham Corporation ...	,, 17	2,131	2,042	— 89	38	94,058	+ 5,325
Portsmouth Corp.	,, 16	2,104	2,148	+ 44	...	...	...
Preston Corporation	,, 13	1,000	1,062	+ 62	36⅔	41,163	+ 5,167
Provincial	,, 16	2,028	1,841	— 187	11	22,436	+ 66
Reading Corporation	,, 14	773	808	+ 35	37⅔	32,052	+ 2,656
Rhondda Tramways....	,, 7	1,121	1,230	+ 109	49	63,135	+ 5,568
Rochdale Corporation...	,, 16	1,541	1,498	— 43	37½	66,713	+ 2,504
Rotherham Corp.	,, 13	1,199	1,494	+ 295	36⅔	57,559	+ 14,445
Salford Corporation	,, 18	5,133	3,403	— 1,730	36⅔	204,568	+ 9,137
Sheffield Corporation...	,, 17	9,418	10,634	+ 1,216	38½	403,438	+ 60,846
Southampton Corp.	,, 13	1,416	1,552	+ 135	36⅔	62,208	+ 6,099
Southend-on-Sea Corp...	,, 13	587	636	+ 49	37	35,510	+ 4,154
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.	,, 16	729	805	+ 76	37½	31,496	+ 1,772
Sunderland Corp.	,, 17	1,472	1,648	+ 176	37	61,681	+ 4,976
Sunderland District...	,, 6	510	594	+ 84	6	3,779	+ 590
Swindon Corporation ...	Nov. 22	165	192	+ 27	33⅔	7,050	+ 290
Torquay Tramways.....	Dec. 7	359	448	+ 89	49	29,129	+ 2,566
Tyneside Trys. & Tmrds.	,, 6	467	562	+ 95	23	15,306	+ 1,364
Wallasey Corporation ...	,, 16	1,084	1,114	+ 30	33½	51,707	+ 3,162
Walsall Corporation.....	,, 16	784	764	— 20	51	41,077	+ 3,425
Walthamstow U.D.C....	,, 16	737	891	+ 154	37	43,875	+ 10,063
Warrington Corp.	Nov. 23	438	491	+ 53	34	17,413	+ 1,469
West Ham Corporation	Dec. 14	3,006	3,048	+ 42	36⅔	119,576	+ 4,912
Wigan Corporation	,, 14	1,536	1,595	+ 59	37	62,650	+ 5,533
Yorkshire (W. Riding)...	,, 17	1,460	1,630	+ 170	51	89,489	+ 9,286

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THE

Tramway & Railway World

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired, should reach us by the second post on Tuesday.

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The Council does not bind itself to accept the lowest or any tender.

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The contractor whose tender is accepted, and with whom a contract is entered into, will be required to pay all workmen employed by him such rates of pay, and observe such hours of labour as are embodied in the schedule, which will be part of the contract. In the event of any breach of such agreement the Council will enforce the penalty clause in its entirety.

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By Order of the Council,

GEORGE E. HILLEARY,
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SATURDAY, DECEMBER 30, 1916.

THE NEED OF MORE LIGHT.

As the result of the extension of restricted lighting of vehicles and streets throughout the whole country during the last three months of the year, the number of persons killed and injured has been so great as to make coroners' juries declare that the disasters of darkness are worse than the effects of air raids. Now that these visitations are becoming too expensive for the pirates of the night, thanks to improved methods of defence, coupled with the valour of British youth, it is time that a responsible body were charged with the duty of determining what relaxation can be made in the restrictions. In the consideration of the matter the recommendations should not be left entirely to the individuals described as the "competent military authority," whether at Whitehall or in the various districts. Our forces owe their present invincibility to the incorporation of the talent of the civil population in the country's service, and the question of lighting is essentially one for experts acting in the knowledge furnished by the reports of the Royal Flying Corps. It was owing to the representations made by experts that numerous towns illuminated by electricity managed to secure the modification of the lighting order, except when a warning has been given of a possible raid. It is evident, however, that if regard is to be paid to public safety such modification does not go far enough. The best evidence of that would be found in reports that ought to be called for by the Home Office as to the number of inquests held in various places, together with a description of the restricted lighting. The demand for an improvement is being urged by various authorities. For instance, Bradford Corporation have called for better lighting of tramway routes. In this connection the usefulness of canopy lights might be insisted upon. They are allowed as an offshoot of the overhead equipment at termini in numerous places to facilitate the reversal of the trolley arm. Again, the Yorkshire Tramway Managers' Association have requested the military authorities to receive a deputation on the subject of car lighting. The matter is one that calls for the immediate consideration of the authorities of the various localities, and unless local effort is put forward the tendency is for centralised control to rest satisfied. An instance is afforded by the slowness of official action to afford relief from the lighting restrictions during the fogs that have lately visited London, culminating on Wednesday last in the entire suspension of road traffic. A week before the Home Secretary had announced that arrangements were being made to provide emergency lights when fogs occur in the metropolitan district. Yet a day after London had suffered the inconvenience of the worst fog for years, and had found its traffic at a standstill as a consequence of the absence of lighting, the citizens received the poor consolation of a notice that the police would allow "the more reasonable use of light from shop windows" during dense fog. How differently things might have been managed if London had possessed a Traffic Board. During the war the intelligent handling of traffic matters by such a body would have been of untold benefit.

SEPARATE QUEUE LOADING PLACES.

In order to meet the increased traffic due to war work and to atone for the lack of central loading facilities due to Halifax not possessing a large central open space, Mr. J. D. Caird, traffic manager of the Corporation Tramways, is early in the new year introducing an improved method for enabling passengers to board the cars in comfort. The scheme will be adopted gradually, in order to get passengers thoroughly accustomed to it. Its main feature is the use of different places for the formation of queues to the cars which start from one terminus but run to different destinations. The first portion of the scheme deals with cars that pass through Commercial Street and proceed either by way of Gibbet Street, King Cross Lane, or to Bradshaw and Causeway Foot. No handrail will be used, and intending passengers are called upon to form two deep, the left hand side for inside passengers and the right hand for the top saloon. The site for the queue will be indicated by a notice board: "Stand here for cars to King Cross, High Road Well," or to whatever place the person wishes to travel. The system will not only do away with the crushing due to passengers alighting and mounting the cars at one and the same place, but will prevent short distance fares crowding out long distance passengers.

Cars coming into Halifax from West Vale, Skircoat Green, and Savile Park, will unload their passengers at pole No. 20, opposite the top of King Edward Street. All passengers for Halifax must alight here. The car will then travel on to pole 21, situate at the bottom of Dawson Street, near the Lancashire and Yorkshire Bank. On either side of this street queues will be formed according to the notice board, and the car will take up passengers. No person will be allowed to board a car between the unloading station and that provided for the taking up of passengers. Cars coming into Halifax from Ovenden, High Road Well, and other places will unload at pole No. 27, at the top of Cheapside, and will then travel on to the top of King Edward Street, where notice boards will be erected and passengers will be taken up for Salterhebble, Savile Park, and other places from the queues arranged according to the notice boards fixed at the top of that street.

ARBITRATION ON EMPLOYEES' DEMANDS.

Sir George Askwith, chief industrial commissioner, on December 21 heard an application on behalf of practically the whole of the tramway employees of Lancashire for increased wages and improved conditions of labour. Alderman Jackson, of the Tramway and Vehicle Workers' Association, put forward the employees' case. The proceedings were private, and the decision is expected at the end of December. In a letter subsequently sent to Bolton Corporation urging the maintenance of the Christmas Day services, Sir George Askwith observed that the award upon the men's cases submitted to the Committee on Production would be dated from December 21.

The chief industrial commissioner has forwarded to Lanarkshire Tramways Company and their employees the following award made by Sheriff Mackenzie on the question of wages:—(1) That the wages of the conductors be increased by 1s. per week, said increase to be recognised as due to and dependent upon the abnormal conditions now prevailing in consequence of the war; (2) that the wages of the motor drivers as fixed by the scale issued in September last be altered to this extent that the maximum rate of 6s. 2d. per shift shall be payable in and after the eighth in place of the tenth year of employment, and that the rates of pay fixed by said scale be otherwise unaltered; and (3) that this award take effect from its date.

An arbitration between the Stoke-on-Trent branch of the Association of Tramway Workers and the Potteries Electric Traction Company has resulted in Sir George Askwith awarding an advance of wages of 1½d. per hour to all motormen, conductors (male and female) and omnibus drivers, with the exception of those who have not been in the company's employ six months, in which case the advance is to be 1d. per hour. The increases are in lieu of war bonuses previously granted aggregating 4s. per week.

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EDINBURGH TRAMWAYS.

INTERVENTION BY MINISTRY OF MUNITIONS—COMPANY'S OFFER.

It is understood that the Corporation of Edinburgh have received an intimation from the Ministry of Munitions that they cannot consent to steps being taken towards the electrification of the cable tramways or the provision of any new rolling stock, in readiness for the expiration of the company's lease on June 30, 1919. The Corporation would thus appear to have no alternative at present but to continue the use of the cable system and the existing cars. That course is facilitated by the reported offer of the company to accept £50,000 for their cars instead of £75,000, which sum they had previously asked, as against £25,000, the sum at which the vehicles were valued by the Council's advisers. The company are also stated to have offered to undertake the upkeep of the rails for a period of six years after the expiry of the lease.

At a meeting of the City Council on December 19 the Town Clerk stated that a letter had been received from Messrs. Macandrew, Wright, and Murray, W.S., on behalf of the Edinburgh and District Tramways Co., Ltd., submitting proposals relating (a) to the taking over by the corporation of the rolling stock of the company, and (b) to the question of the renewal of the tramway rails, etc. Councillor Allan proposed that consideration of the matter be delayed till after consideration of the report by the tramway experts regarding the future policy of the street tramways. The Town Clerk pointed out that the letter must be sent to the Tramways Committee, who would report upon it. The Council agreed to the latter course, the Lord Provost observing that the Committee would deal with the whole matter of the tramways and report to the Council on January 16.

Councillor Harrison, chairman of the Tramways Committee, presented a report recommending "that communications be opened up with the Admiralty and any others concerned with a view to ascertaining whether there is present or prospective need for further transport facilities between Edinburgh and Queensferry and Rosyth, and, if so, what these facilities should be, and what assistance may be available to the Corporation in the event of their resolving to provide them; and in the event of this recommendation being approved of, the Committee crave a remit to carry out the resolution, to consider the information to be obtained, and to report the same to the Council along with any recommendations they may resolve to make." A decision was unanimously arrived at by the Tramways Committee on December 27 to recommend the Corporation to accept the Company's offer to sell the rolling stock, cables and other plant, for £50 000. The Committee also agreed to communicate with the Admiralty respecting the Rosyth scheme. The recommendation was adopted.

OMNIBUSES SUGGESTED FOR EDINBURGH.

COMPARATIVE WORKING COSTS OF OMNIBUS AND TRAMWAY.

Under the auspices of the various merchants' associations of Edinburgh, Sir John H. A. Macdonald, K.C.B., recently gave an address entitled: "Public Street Conveyancing To-day." While affirming that the citizens would rejoice to see the cable tramway cleared away, he said that it was not the best form of tramway conveyance that was the question, but what was the best use of the whole roadway in the interests of all classes of traffic, and the maintenance of the city. Within six years of the introduction of motor omnibuses in London 7,400 omnibuses were in operation, and were earning substantial dividends, while the London County Council presented a deficit on their tramway system of from £70,000 to £80,000 a year, and that was the case at present. To-day in London the mileage served by omnibuses was 456, while the tramway mileage was only 330, and that indicated how the trend of public favour was towards free moving vehicles. Eastbourne had refused to lay down tramway rails; in Oxford rails had been taken up and an omnibus service substituted; and Brighton had an omnibus service running east and west. Such facts as these were worth a thousand opinions of experts. Was this a time to embark upon a scheme on which half a million of capital would have to be sunk if by any reasonable means it could be avoided? Was it reasonable that such sums should be laid out if a service could be provided similar to what had proved satisfactory elsewhere, with outlay for vehicles alone. The success of the company that had for years run omnibuses from the centre of Edinburgh to the east and west and far into the country, and the phenomenal success of the London General Omnibus Company, were surely sufficient ground for holding that public enterprise would supply what was wanted, saving the city from being burdened with heavy debt. The placing of standards, brackets, and wires in Princes Street, the Mound, and the North Bridge would be most disfiguring.

A discussion ensued, in the course of which Mr. C. W. Shepherd, formerly manager of the Tramway Company, said the London omnibuses enjoyed a monopoly. The London public preferred the omnibus because it ran into the heart of the city. Central London could not be compared with any other place. It was so congested with other traffic that there was no room to put rails down. On the question of working expenses he said the cost per mile, including the cost of rails, for an electric tramcar was 5*d*. to 5½*d*., and, taking the pre-war price of petrol, the cost of running motor vehicles was a fraction under 10*d*. per mile.

Sir J. H. A. Macdonald, replying to the discussion, said that the London G.O.C. were running a big motor omnibus system quite as well as any tramways that existed. As to the mud nuisance from omnibuses in Edinburgh, the cure was to have no mud upon the streets, and that was for the municipality. The reason why the shop windows were bespattered with mud was because the buses were obliged to run at the edge of the pavement through the tramways being in the middle of the street.

MISCELLANEOUS NEWS AND NOTES.

Request for Adequate Lighting of Tramways.—Bradford Tramways Committee have forwarded to the military authorities a resolution in favour of adequate lighting on tramway routes where electric lamps exist.

New Plant for Sunderland.—The Ministry of Munitions have sanctioned an expenditure of £45,000 for new plant for the Hylton Road Works of Sunderland Corporation. A tender for a new turbo-alternator, which forms part of the scheme, has been accepted.

Collision at a Point.—A number of passengers were injured at Preston in a collision between two tramcars which met end on at the points in Deepdale Road. The accident was caused by one of the cars jumping the points.

New Generating Station for Sheffield.—Following the recommendations of the Electricity Committee in favour of providing a new generating station, the Parliamentary Committee of Sheffield Corporation have advised the Corporation to promote a Bill in the present session of Parliament to enable the scheme to be carried out.

Expensive Accidents. Sums of £750 and £150 were passed for payment at the December meeting of Portsmouth Corporation to two passengers who were injured in separate accidents. The chairman of the Tramways Committee stated that the accident involving the payment of the larger sum was not the fault of the motorman.

Sterling Telephone and Electric Company.—The whole of the enemy shares of the Sterling Telephone and Electric Company, Ltd., of London and Dagenham, have been acquired from the Public Trustee by Sir John Bethell, Bart., M.P., who has consented to act as chairman of the company. Sir Thomas Bethell and Mr. C. S. Syrett have also been elected directors of the company.

Services Suspended Owing to Fog.—Practically every district in London was without vehicular traffic in the streets after the first rush of the workers to the suburbs on Wednesday evening. The fog was so thick that every class of conveyance was withdrawn, thus throwing great pressure on the Underground Railways. As usual the organisation of the electric railways proved fully equal to the demand.

A Santiago Tramway Scheme.—A decree has been published granting to Don Eduardo Heyraud permission to construct and work for a period of ten years an electric street railway between Santiago and Renca. The line will be of metre gauge and approximately eight kilometres (about five miles) in length. In reference to the foregoing, the Board of Trade points out that the exportation to Chile of certain kinds of railway material is prohibited.

The Institution of Automobile Engineers.—The fourth ordinary general meeting will be held in the hall of the Royal Society of Arts, John Street, Adelphi, W.C., on January 10, at 8 p.m., when Colonel R. E. Crompton, C.B., R.E., will read a paper entitled "Notes on Screw Gauges." Cards of invitation may be obtained on application to the Secretary of the Institution of Automobile Engineers, 28, Victoria Street, Westminster, S.W.

Track Complaints.—A conference has taken place between representatives of Brentford Urban Council and the London United Tramways Company respecting the condition of the track. The company's representative explained that the staff had been greatly depleted, and no rails had been obtainable during the war. The management would see what steps could be taken in High Street, but they denied that the track was dangerous.

Serious Accident at Nottingham.—On the night of December 26 a Basford to Cotwick car, when descending Derby Road, got out of control. Near the corner of Market Street it ran into a stationary car, which was thrown on its side. A pedestrian was knocked down and decapitated, and a passenger died soon after removal to hospital. The driver of the Basford car was taken in an unconscious condition to hospital, with two other persons, who were suffering from severe lacerations and contusions. Three other persons sustained minor injuries.

"Electrical Engineering" in its issue of this week takes leave of its readers after ten years of weekly publication. Its editor and managing director, Mr. F. C. Raphael, has received a commission in the army and is stationed away from London; and the assistant editor, Mr. S. R. Roget, is in the Anti-Aircraft Corps (R.N.V.R.). Other members of the staff are with the forces. The Kilowatt Publishing Co., Ltd., the proprietors of "Electrical Engineering" will immediately go into voluntary liquidation, and all liabilities will be paid in full.

Conductor Awarded Damages.—A widow employed as a conductor by the Lancashire Tramways Company sued, in Hamilton Sheriff Court, a man named James Watson for damages. She stated that when she challenged him with having exceeded the stage limit covered by his ticket he struck her a blow on the face, rendering her unconscious, whereby she had suffered pain and shock and loss of work. Sheriff Shennan said there was no doubt the defender committed a cowardly and unprovoked assault, and he assessed the damages at £25, with expenses.

Traffic Impeded by Snow.—Considering the decreased staffs available for clearing the roads of snow, some creditable work was performed in Glasgow, in North Staffordshire, and in parts of Lancashire, on December 19, in freeing the tramway tracks. At Glasgow the cars got through at the cost of a little irregularity. In the Potteries, the services were not restored until the morning was well advanced, the omnibuses of the Potteries Electric Traction Company also being affected. The snow became frozen in the points, which had to receive attention from sweepers after the ploughs had passed. In Stoke, a railway accident prevented the passage of trains through the city, but in other districts the railway service gained many extra passengers.

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The Increased Railway Fares.—In common with other railway companies, the London Underground Railway Companies have reeceived authority from the Board of Trade, under Regulation 7B of the Defence of the Realm Orders, 1914, to increase passenger fares by one half on and after January 1, 1917. It does not follow that the Underground management will increase their fares. The object of the increase is to curtail passenger traffic in order to enable the railway companies to comply with the demands made upon them in connection with the war.

Omnibus Income Tax and Depreciation.—A deputation from the Municipal Tramways Association, the Tramways and Light Railways Association, and the London and Provincial Motor Omnibus Organisation is waiting on the Board of Inland Revenue with reference to the rate of depreciation allowed n the assessment of motor omnibuses to income tax. The matter has engaged the attention of a joint committee of the several organisations during the past year with a view to the adoption of a uniform method of determining depreciation. Mr. A. R. Fearnley, general manager, Sheffield Corporation Tramways, is a member of the deputation.

Increase of Tramway Fares at Darlington.—At their meeting on December 18, Darlington Rural District Council were asked by the Light Railway Commissioners whether they had any observations to offer with reference to the application of the Darlington Corporation for power to increase the charge on the tramways beyond the limit of one penny as at present. The proposal affects passengers both within and without the borough, but several members observed that the Harrogate Hill ride was a long one for a penny, and they did not think that the halfpenny increase would be objected to. The Council decided to offer no objection to the Corporation's application.

Committee on Production Support Christmas Traffic.—Sir George Askwith, the chief industrial commissioner, sent the following letter to the representatives of the tramway authorities who attended the recent investigation of the claims of employees for increased remuneration: "With reference to the question which was raised on December 21 before the Committee on Production, the Committee as intimated, are of opinion that the tramways employees should work as usual on Christmas Day and not take holiday. The Committee mentioned that tramways were important to a large number of persons who have been working without holiday for a long period and to soldiers on leave from the front."

Extensions at Kilmarnock.—The borough electrical engineer (Mr. Bexon) has reported that in his opinion Sir Alexander Kennedy's recommendation to instal a further 3,000 kw. turbo-alternator will not meet the future requirements of the undertaking. He advises a 5,000 kw. set in order to give a reasonable margin of reserve. Mr. Bexon also points out that there is at present insufficient boiler capacity to deal with the new load, and recommends the disposal of two of the three Lancashire boilers now in use, and the substitution for them of a Babcock and Wilcox boiler with an evaporative capacity of 25,000 to 30,000 lbs. of steam per hour. The comments of the borough electrical engineer are to be referred to Sir Alexander Kennedy for his opinion.

London's Lights May Go Up.—A writer in the "Evening Standard" says that there is a possibility of the lights of London being restored to their full pre-war brilliancy within the next few weeks. The authorities consider that London's system of defence against aircraft is now so complete that this step can be entered on with perfect safety. Combined with London's defences are, of course, the elaborate plans for warnings from the coast as well as from our sea and air patrols, and it is felt that, particularly after the last warm welcome accorded the Zeppelins, there is now little danger to be feared from the nocturnal raiders. In the meantime, it may be added, there is the very great and ever present danger of locomotion in darkened streets. The absurdity of throwing London into unrelieved darkness just at the hour in the evening when business houses are closing and the streets are most crowded, needs little comment. Sufficient is provided by the growing list of serious accidents.

Christmas Traffic.—In recognition of the demands made upon the energies of tramway employees by the restricted lighting and the war traffic, a holiday was granted to them in many towns either on Christmas Day or on the Sunday. In some places the national holiday to munition workers was the cause of the cars continuing to run, but in these instances the services were curtailed as much as possible. For the first time, apparently, the employees of one of the principal London undertakings, viz., the Metropolitan Electric Tramways, asked to be granted a holiday on Christmas Day or on Boxing Day. The management advanced the needs of the munition workers on holiday as the cause for refusing the application. There was a considerable curtailment of the London omnibus services. At Oldham the Tramways Committee refused an application that the cars should run to the football ground between 2 and 6 p.m. on Christmas Day, Councillor Cheetham, chairman of the Tramways Committee, remarking that the employees were working overtime 20 hours a week.

The Warning of Following Cars in Fog.—At an inquest at Birmingham on a man who was fatally crushed between two cars, it was stated that in a heavy fog it was customary for male conductors of cars that stopped to walk back and warn cars coming behind. It was, however, not considered safe to allow women conductors to adopt that course, and so in this case the precaution was not taken. The evidence showed that deceased, while waiting to board a car, stepped back between two cars to avoid a motor-car. At this moment a third car came along and ran into the second car, which crushed the deceased against the first car. "Accidental death" was the verdict. The case recalls an inquest recently held at Leicester in which the trolley arms of two cars left the wire at a curve, the vehicles consequently being invisible in the darkened street. The rear car ran into the first car, a pedestrian being fatally injured. The woman conductor of the leading car was endeavouring to replace the trolley arm before going back to close the points. A verdict of accidental death was returned, and the coroner expressed the view that it was more important to get the lights switched on than to replace the points.

Hull Council and Halfpenny Fares.—By 19 votes to 16 a special meeting of Hull Corporation on December 27 referred back to the Tramways Committee for further consideration the recommendations that halfpenny stages be suspended during the period of the war, that a flat rate of one penny be charged on each route, and that no change be made in the present arrangements under which soldiers have free use of the cars on week-days. Councillor W. Wheatley, chairman of the committee, advocated a charge of one halfpenny for soldiers, suspension of the early halfpenny fares, abolition of transfer tickets to and from the Old Town within the docks, and a reduction in the number of stopping places, so as to save wear and tear, and reduce the consumption of energy. He stated that there would be a large influx of service men to Hull, and that the tramway employees had made a request for a further bonus of 3s. per week and an increase of 3d. per hour in the payment for overtime. These demands would cost £6,500, and, added to his estimate of a loss of £2,500, the total loss at the end of the financial year would be £9,000. He wanted the Council to accept the responsibility. In supporting the committee's recommendations, Alderman Hargreaves, ex-chairman of the committee, said it was not surprising an alteration was required in a tariff that was fixed in normal times. War expenses could not be paid out of a tariff fixed in time of peace. Seventy thousand men who might be classed as more or less permanent passengers were out of the town. For every hour the service was suspended on the occasion of alarms there was a loss of £20.

PERSONAL.

Mr. E. P. Austin, assistant borough electrical engineer at Chesterfield, has been granted an increase in salary to £250.

Mr. W. M. Girvan, a member of the staff at the Belfast Corporation electricity works, has been appointed general superintendent at the central generating station.

Mr. W. B. MacCabe, chief engineer to the Corporation of Calcutta, has retired from that post, to which he was appointed in 1903. He has gone to reside on an estate he has purchased in Tasmania.

Mr. A. H. Felton, works superintendent, Newport Corporation Electricity Works, has received an addition of £25 to his salary. Four other officials in the department have also been awarded increases.

Mr. A. G. Bradshaw, borough engineer of Lancaster, has been given an appointment with the rank of captain in connection with road-construction and re-organisation scheme in France under Brigadier General Maybury.

Mr. Neville Chamberlain has resigned the Lord Mayoralty of Birmingham, and has taken up the duties of Director-General of National Service. There will be a military and a civil wing of the department, the former being directed by Major-General A. Campbell Geddes. Mr. Chamberlain has stated that it will be his duty to find labour for the essential industries, including munition factories, agriculture, mining, shipbuilding, and the various subsidiary and auxiliary trades, from among volunteers who will be asked to enrol. These volunteers may be expected to come partly from unoccupied persons and such as are now employed during part of their time, and also from certain trades, to be scheduled hereafter, which are not considered as essential to the nation.

Mr. George Kidd, general manager of the British Columbia Electric Railway, and the staff were cordially thanked at the annual meeting of the shareholders for their services during the past year. Mr. Harold Brown, a director, in moving the resolution, said it was difficult to speak too highly of the way in which the company had been served by the staff in the most difficult and trying circumstances They had never lost heart, and had given the most untiring services in the endeavours to cut down the expenses, and to increase the earnings. The directors had had the advantage of seeing Mr. Kidd in this country during the autumn, and the more they saw of him the more they were confirmed in their view that they had the right man in the right place. Mr. M. Urwin, the London Secretary, acknowledged the vote.

Sir William Mackenzie was elected as an additional director of the British Columbia Electric Railway at the annual meeting in London on December 22, thus making the number of directors nine. Sir William is president of Toronto Railway Company, Toronto Power Company, Winnipeg Electric Railway Company, and other public utility enterprises in Canada, and the directors desired to secure for the company the advantage of his wide experience. Mr. R. H. Sperling having been granted a commission in the Army had retired from the board to the great regret of his colleagues, but he has accepted the position of adviser to the board, upon which Sir W. M. Aitken, M.P., and Mr. J. Davidson had accepted seats. the two latter gentlemen were re-elected at the annual meeting together with Mr. G. P. Norton and Mr. Harold Brown. Gratification was expressed that the services of Sir Max Aitken had recently received further recognition.

We record with deep regret the death of Mr. Arthur James Ireland, who was for many years associated with the British Thomson-Houston Company, Ltd. Mr. Ireland resided at Kingswood, Gipsey Lane, Putney, and the funeral took place at Barnes New Cemetery, Upper Richmond Road, Sheen, on Thursday.

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CONTRACTS AND ORDERS.

Glasgow Tramways Committee have accepted the tender of W. T. Henley's Telegraph Works Company for the supply of rubber insulated cables.

Newport Council have accepted the appended tenders:—British Westinghouse Electric and Manufacturing Co., Ltd., Trafford Park, converting plant and accessories; British Thomson-Houston Co., Rugby, switchgear.

Omnibuses Suggested for Reading.—The Tramways Committee recently recommended the purchase of three double-deck Tilling-Stevens petrol-electric omnibuses, in order to institute a service to Caversham Heights. The Corporation did not adopt the proposal.

Johannesburg Council have placed contracts for tramway supplies with Hadfield's, Ltd., Griffin Engineering Company, H. Davies and Co., H. M. Dowson and Messrs. Rennert and Lenz. For the electricity department the following tenders have been accepted:—Cable Telegraph Manufacturing Co. London; eight transformers and spares, R. H. Gould and Co.; steam-driven boiler-feed pump, Messrs. Sturrock and Co., with turbine by Belliss and Morcom, Birmingham, and pump by Rees Roturbo Co., Wolverhampton.

FINANCIAL REPORTS AND MEETINGS.

Millars' Timber and Trading Company.—The half-yearly dividend on the preference shares, due on January 1, will not be paid.

Tucuman Tramways, Light and Power Company.—After providing for debenture interest, administration expenses, etc., the accounts for the year to June 30 show a profit of £7,306, thus reducing the debit balance of £12,516 brought in to £35,210.

John I. Thornycroft & Co., Ltd.—At the annual meeting of shareholders of John I. Thornycroft & Co., Ltd., in London, Mr. John E. Thornycroft said the work being done was now four times that of pre-war times, and the Board felt justified in paying 10 per cent. on the ordinary shares.

Scottish Motor Traction Company.—The net profit for the year ended September 30 after writing off expense of the recent issue of capital and transferring £2,000 to reserve fund, amounted to £6,560 and £2,119 was brought forward. A dividend is proposed of 7½ per cent. free of income tax, carrying forward £2,142.

Buenos Ayres Lacroze Tramways.—The sum of $728,157 is available as the result of the past year's trading. Of this sum the Board propose to place 5 per cent. to reserve and to allot 5 per cent. for directors' remuneration; ½ per cent. is to go to the syndic and $625,000.00 to the shareholders, leaving $35,483.40 to be carried forward.

Hailey's Industrial Motors.—The net profits for the past year, including £3,800 brought forward, amounted to £11,546. A final dividend of 5 per cent. and a bonus of 1s. per share, free of tax, are proposed, making 15 per cent. for the twelve months, and leaving £15,726 to be carried forward. The net profits for the previous year were £7,444.

Buenos Ayres City and Suburban Railway.—The annual report of this company states that the construction of the line between Olivos and San Isidro has been finished, but the level crossing over the Central Argentine Railway Company at Olivos has not yet been built and the line beyond that point has not been opened. Relations with the municipal and provincial authorities continue to be satisfactory.

Dick, Kerr and Company and the United Electric Car Company.—The purchase of the shares of the United Electric Car Company, Ltd., by Dick, Kerr and Company does not mean that the former will cease to exist as a separate company. As mentioned in our last issue, the only change is that a new board of directors nominated by Dick, Kerr and Company will be appointed. All the members of the present board, however, with the exception of Mr. R. H. Prestwich, who is vice-chairman of Dick, Kerr and Company, will retire and will receive a sum of £3,000 as compensation for the loss of office.

D. Napier and Son's Increased Dividend.—The report of D. Napier and Son, Ltd., private and commercial motor vehicle manufacturers, for the year ended September 30, states that the profit, after allowing for depreciation, etc., amounted to £76,856, to which is added the balance brought forward from last account, £9,839. After deducting expenditure in dividends, etc., there is a balance of £50,557. The directors recommend a dividend of 6 per cent., less income tax, on the ordinary shares, the placing to general reserve a further £20,000, and the carrying forward to next year a balance of £9,557. For 1913-14 the ordinary dividend was 3 per cent., and for 1914-15 5 per cent. was paid.

National Steam Car Company.—The report for the year ended October 31 last states that the profit, after making provision for maintenance, depreciation, etc., is £52,379. Of this sum £19,500 has been placed to the special reserve for the renewal of buses, £9,309 applied to special writings off, and out of the balance of £23,570 the directors recommend a dividend of 10 per cent. This will absorb £15,750, leaving, with the amount brought forward of £4,405, a total of £12,225 to carry forward, against which there is special taxation of which the amount has not yet been ascertained. The fleet of omnibuses has been maintained in the highest possible state of efficiency, having regard to the special conditions prevailing on account of the war, the average number licensed during the year being 160. The directors state that the coke motor lorries manufactured by the company have further demonstrated their economical working, and in order to provide increased facilities for their manufacture the board propose to increase the capital by £100,000.

Cardiff Corporation Tramways.—The city treasurer has reported that for the year ended March 31 last the traffic receipts amounted to £140,875 17s. 5d., as against £138,672 2s. 7d. for the previous year, or an increase of £2,203 14s. 10d. The total income amounted to £167,793 19s. 10d., or £3,111 1s. 10d. more. The payments to reservists and recruits on service amounted to £5,326 16s. 11d., which directly contributed to a reduction in the surplus of income over expenditure for the year. From the surplus of £20,524 14s. 1d. a sum of £6,946 10s. had been transferred to the depreciation fund. The balance of the depreciation fund amounted to £70,606 7s. 6d., and a sum of £3,013 19s. 10d. was spent during the year on the reconstruction of the track. The net loan liability of the undertaking amounted to £445,296 13s. The amount paid off and set aside for redemption of debt, represented 37.39 per cent. of the total liability, in addition to which there were substantial funds in hand for insurance, depreciation, etc. The total capital expenditure was £305,775, of which £7,585 was expended during the year.

British Columbia Electric Railway.—In the absence of Mr. Horne-Payne, the chairman, Mr. G. P. Norton presided at the annual meeting of this company on December 22, when a speech prepared by the chairman of the company was read. In it he stated that the gross income for the year ended June 30 last was only £258,000, as compared with £370,000 in the preceding year and £560,000 for 1913-14. These decreases were due to a reduction of 30 per cent. in the population owing to the voluntary enlistment in the Army of the Empire, and to the continued unfair competition of jitney cars. This competition had been less acute than in the previous year, but these cars were still depriving the company of approximately $350,000 a year. Every effort had been made to endeavour to secure that the jitney owners should be subject to similar control of service as the company and that they should contribute to municipal revenue, but it had as yet been impossible to convince the authorities and the public of the folly of the preferential treatment to the rivals of a great enterprise, which had done so much for the Province. Concessions to the employees involved an increase of $100,000 per annum in the cost of labour. During the four months of the current year there was an increase of over £30,000 in net earnings as compared with the corresponding period of last year. The directors hoped that this increase would continue so as to enable them to meet the dividend on the 5 per cent. cumulative preference stock without having recourse to the reserve fund, as they have had to do this year, and perhaps leave a small surplus

WEEKLY TRAMWAY TRAFFIC SUMMARY.

The official traffic returns of forty-four of the principal tramway undertakings in the United Kingdom for the week ended December 16 give total receipts of £169,081, or £128 more than in the corresponding week of last year. The total length of track included in the returns was 2,230 miles, or 66 more than for the corresponding week. The receipts this year were at the rate of £75 16s. 5d. per mile of single track, and last year at the rate of £78 2s. 2d., thus showing a decrease for the week of £2 5s. 9d. per mile open. The principal London and certain provincial tramways have temporarily discontinued the publication of traffic receipts.

Skefko Ball Bearings.—This month the Aktiebolaget Svenska Kullagerfabriken of Sweden, the parent company of the Skefko Ball Bearing Co., Ltd., attains its tenth birthday. In 1906 the staff, including commercial, manufacturing and technical departments, numbered fifteen all told, and at the present time the company has extended its branches to practically every large city throughout the world, employing approximately 9,000 people. Mr. Sven Wingquist, the inventor of the Skefko double row self-aligning bearing and the founder of the Aktiebolaget Svenska Kullagerfabriken of Sweden, attains his 40th year on December 10.

Messrs. Tilling-Stevens, Ltd., Maidstone, have sent to us a novelty in the form of a "signature blotter" consisting of strips of blotting paper about 8 in. by 1½ in., secured to an ivory top bearing the calendar for the whole of 1917, and having inches on one margin and centimetres on the other. The top also bears the name of the firm and the words "Commercial motor vehicles."

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PRICE LIST OF TRAMWAY AND OMNIBUS SHARES.

DIVIDENDS. PREV.	DIVIDENDS. LAST.	NAME.	PAID.	PRICE, JULY 27 1914	CASH. DEC 28.	A WEEK AGO.
5%	5%	Alabama Traction. 5% 1st. Mt.	—	67	75½	76½
2/9	2/9	Anglo-Argentine 5½% Pref. ...	5	4¼	57/6	57/6
4%	4%	Do. 4% Deb. ...	100	91	65½xd	65½
4½%	4½%	Do. 4½% Deb. ...	100	98½	74xd	74
5%	5%	Do.. 5% Deb. ...	100	96	63	62
7d.	1/–	Auckland Elec. Trams. Ord. ...	1	1⅝	21/–	21/–
5%	5%	Do. 5% 1st Mt. Deb. ...	100	102½	93½	93½
6/–	6/–	Bombay Elec. Supply and Tramways 6% Cum. Pref. ...	10	11½	10½	10½
4½%	4½%	Do. 4½% Deb....	100	96	82	82
5%	5%	Do. 5% 2nd Mt. Deb. ...	100	100	91½	91½
$1	$1	Brazilian Trac. & Power Ord. ...	$100	66	49½	48
$1½	$1½	Do. 6% Cum. Pref.	$100	97	85	84⅝
4/–	4/–	Brisbane Elec. Trams. Ord. ...	5	7½	6¾	6⅝
2/6	2/6	Do. 5% Cum. Pref.	5	5	77/6	77/6
4½%	4½%	Do. 4½% 1st. Deb.	100	101½	92½	92½
8%	8%	Brit. Col. Elec. Ry. Def. Ord....	100	107	36	35
6%	5%	Do. Pref. Ord....	100	106	41	41
5%	5%	Do. 5% Cum. Pref.	100	103	60½	66
4½%	4½%	Do. 4½% 1st Mt. Debs. ...	40	99½	87	87
4½%	4½%	Do. 4½% Perp. Con. Deb. ...	100	96½	61	60½
—	£3*	Brit. Elec. Trac. Ord.	100	—	33⅜	34
6%	6%	Do. 6% Cum. Part Pref. ...	100	—	74xd	74
5%	5%	Do. 5% Deb.	100	92	80	80
4½%	4½%	Do. 4½% 2nd Deb.	100	77½	69⅜	69⅜
5%	5%	B.A. Lacroze 5% Mt. Deb. ...	100	100	80½	79⅜
6/6	3/–	Calcutta Tramways, Ord. ...	5	7½	7 1/16	7 1/16
1/3	1/3	City of B.A. Trams.	5	5½	81/–	81/–
5/–	4/–	Dublin United Trys 6% Pref.	10	12	10½	10½
5%	5%	Hong Kong Trys. 5% Mt. Dbs.	100	87½	79⅜	79⅜
2/6	3/–	Isle of Thanet 5% Pref. ...	5	2½	27/6	27/6
5%	5%	Kalgoorlie Trams. 5% A. Deb....	100	84½	74½	74½
—	—	La Plata Trams. Ord.	1	⅜	2/1½	2/1½
6/–	6/6	Lanarkshire Trys. Co.	10	10½	9 25/32	9 25/32
5%	5%	Lisbon Elec. Trys. 5% Mt. Dbs.	100	95	81	81
9 3/32d.*	9 3/32d.*	Llandudno & Colwyn B. Ord. ...	1	—	9/10½	9/10½
—	1 3/32d.	Lond. & Sub. Traction Ord. ...	1	1 3/32	1/10½	1/10½
6d.	6d.	Do. 5% Pref.	1	1 3/32	8/4½	8/4½
4½%	4½%	Do. 4½% 1 Mt. Deb. ...	100	75½	66	66
4½%	4½%	L.G.O. 4½% 1st Deb.	100	100	88	88
5%	5%	Do. 5% Inc. Deb.	100	88½	78⅝	78⅝
4%	4%	Lon. Unt. Trms. 4% 1st Mt. Db.	100	55	45	45
3/–	3/–	Madras Elec. 6% Pref. ...	5	5 1/16	96/6	96/6
5%	5%	Manaos Trams. 5% 1st Deb. ...	100	77	66⅔	66⅔
$1½	$1½	Manila Elec. R. R. & Light ...	$100	102	65	67½
4½%	4½%	Met. Elec. Trams. 4½% Deb. ...	100	85½	74½	74½
$1½	$1½	Mexico Trams. Common ...	$100	70	22	22
5%	5%	Do. 1 Mt. 5% G.B.	—	84	30	30
6%	6%	Do. 6% Mt. Bds.	100	76	25½	25½
4½%	4½%	Montreal St. 4½% Stg. Debs. (1922)	100	100	93	93
4½%	4½%	Do. 4½% Stg. Debs.	100	99	92⅝	95
1/–*	1/2d.*	National Steam Car	1	15/32	21/6	22/–
9½d.*	9½d.*	New General Traction	1	½	7/9½	7/9½
8½d.	6d.	Northern Gen. Trans. Ord. ...	1	½	13/9	13/9
6/–*	5/–*	Para Elec. Rlys. Ord.	5	4½	70/–	68/–
5%	5%	Do. 5% 1st Deb.	100	89½	75½	75½
5%	5%	Portland Ry. 5% 1st Mt. 30 yr.	—	96	80⅝	80⅝
6d.*	7½d.*	Potteries Elec. Tram. 5% Pref.	1	15/32	11/–	11/–
8d.	1/4	Provincial Trams. Ord.	1	½	20/6	20/6
5%	5%	Rhondda Trams. 5% 1 M.D. ...	100	88	82	82
5%	5%	Rio de Janeiro Try. & Pr. 1st Mt. 30 yr. 5% Gld. Bd. '35	—	97½	91½	91½
5%	5%	1st. Mt. 5% 50 yr.	100	89½	73	74⅜
5%	5%	Sao Paulo Deb. 5% 1st Mt. ...	$500	99	88½	88⅜
5%	5%	Do. 5% Perp. Deb.	100	99½	77½	77½
—	3d.	Singapore Elec. Trams	5/–	½	4/10½	4/10½
5%	5%	S. Elec. Trams. of B. A. 5% Mt.	—	100½	94	94
4½%	4½%	Tramways (M.E.T.) Omnibus 4½% Debs.	100	91	81	81
4½%	4½%	Toronto 1st Mt. 4½% Bds. ...	100	98	97½	97⅜
4½%	4½%	Winnipeg El. 4½% Pp. C. Deb.	100	94½	77	77
—	—	Yorks. (W.R.) Elec. Trm. Ord.	5	⅛	9/3	9/3
3/–	3/–	Do. 6% Cum. Pref.	5		95/–	95/–
—	—	Metropolitan Dist. Ord. ...	100		16⅜	16½
—	—	Undgd. Elec. Rys. of London ...	10	2½	42/6	41/3
		Do. "A"	1/–	⅜	6/7½	6/3
4½	4½	Do. 4½% Bds of 1933 Rd.	—	99	100½	101
6	6	Do. 6% 1st Cum. In. Db.	100	114	100½	100½
6	6	Do. 6% In. Bonds Rd. ...	—	88	92 1/16	92 1/16

*Indicates dividend for the year. In other cases the dividend is for the half-year.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or Month.	Latest Return. 1915	Latest Return. 1916	Aggregate. Wks.	Aggregate. 1916	Increase or Dec.
Anglo-Argentine	Dec. 23	£52,156	£53,083	52	£2,614,302	+ £7,123
Auckland.....(28 days)	Nov. 20	20,910	20,729	20	105,015	+ 979
Ballarat and Bendigo ...	Nov.	3,586	3,429	32	25,539	+ 443
Brazilian Traction Mlrs.	Oct.	6,793,000	7,037,000	44	68,286,000	+ 4,035,890
Brisbane	Nov.	31,120	26,740	48	357,160	+ 10,086
British Columbia.....$	Oct.	538,826	573,544	18	2,202,570	+ 128,873
Buenos Aires Lacroze ...	Nov.	46,033	42,603	22	207,402	— 16,614
Burmah Tram.&Light Rs.	Nov.	23,695	26,824	18	104,753	+ 8,205
Calcutta.....Rs.	Dec. 22	67,680	73,174	52	3,422,170	+ 193,801
Cape Town	Oct.		14,238	...	...	...
Carthagena & Herrerias..	Nov.	2,090	2,252	48	27,391	+ 7,552
Cordoba	Oct.	13,441	13,533	31	98,087	+ 740
Costa Rica	July	3,046	3,223	...	...	...
East India	Nov.	2,065	1,942	17	9,067	+ 613
Hong Kong .....$	Nov. 25	10,701	11,686	50	674,249	+ 157,234
Kalgoorlie	Sept.	2,997	2,788	39	23,267	— 1,849
La Plata	Nov.	4,564	4,342	48	46,399	— 429
Lima	Nov.	30,720	33,625	48	370,975	+ 19,763
Lisbon .....Escu.	Oct.	...	203,955	...	..	...
Madras .....(2 weeks)	Nov. 30	25,837	29,664	47	695,170	+ 51,009
Manila	July	23,750	33,700	31	887,739	+ 39,986
Manaos .....Rs.	Oct.	...	150,275	...	...	...
Melbourne	May	...	69,275	...	...	...
Montevideo	Nov.	28,407	28,404	4	28,404	— 3
Pernambuco	Dec. 24	3,669	4,200	51⅞	159,250	+ 1,004
Peruvian .....$	Nov.	751,720	925,820	22	4,514,650	+ 656,873
Port Elizabeth	Oct.	...	3,131	...	...	...
Rangoon	Nov.	5,028	5,033	48	51,404	— 1,839
Shanghai .....$	Nov. 15	28,278	33,992	...	...	...
Singapore .....$	Nov. 18	11,473	12,833	45	581,307	+ 58,246
Toronto.....$	Oct.	792,091	907,460	44	8,913,224	+ 970,618
Winnipeg	Oct.	286,146	278,817	44	2,740,271	— 59,324

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAME.	Week ended	Latest Return. 1915	Latest Return. 1916	Latest Return. Incr. or Dec.	Aggregate. Wks.	Aggregate. 1916	Aggregate. Incr. or Dec.
Aberdare U.D.C.	Dec. 19	£338	£338	nil	38	£15,013	+ £1,654
Aberdeen Corporation...	„ 20	1,709	1,805	+ 96	29	55,931	+ 3,388
Accrington Corp.	Nov. 29	498	520	+ 22	38	20,419	+ 860
Ayr Corporation	Dec. 23	256	268	+ 12	32	14,013	+ 1,225
Bath Electric	*	...	...	...	...	...	...
Birkenhead Corp.	„ 24	1,422	1,593	+ 171	38½	59,363	+ 6,158
Birmingham Corp.	„ 16	15,610	13,039	— 2,571	37	591,081	+ 55,116
Do. Motor Omnibuses	„ 16	751	859	+ 108	37	37,334	+ 5,440
Blackburn Corp.	„ 20	1,128	1,022	— 106	38⅔	48,255	— 989
Blackpool & Fleetwood.	„ 23	316	318	+ 2	51	43,571	+ 4,842
Blackpool Corp.	*	...	...	...	...	...	...
Bolton Corporation	„ 24	2,762	2,996	+ 234	39	112,086	+ 8,078
Bournemouth Corp.	„ 27	2,037	1,898	— 139	39	90,340	+ 6,588
Bradford Corporation ...	„ 16	6,530	6,950	+ 420	37	255,182	+ 9,969
Brighton Corporation ...	„ 24	954	1,116	+ 162	38⅔	49,337	+ 5,427
Bristol	„ 22	12,698	11,265	— 1,433	51	515,184	+ 21,396
British Elec. Federa'n...	*	...	...	...	...	...	...
Burnley Corporation.....	„ 23	1,700	1,628	— 72	39	66,338	+ 3,620
Burton-on-Trent Corp...	„ 24	315	339	+ 24	38	10,687	— 524
Bury Corporation.....	„ 24	1,320	1,237	— 83	38⅔	54,901	+ 2,377
Cardiff Corporation.....	Nov. 25	2,388	2,871	+ 483	34	104,246	+ 10,516
Chatham & District.....	Dec. 14	1,039	1,078	+ 39	50	61,340	+ 3,423
Chesterfield Corp.	„ 21	273	245	— 28	38	10,545	+ 207
Colne Corporation	Nov. 25	210	240	+ 30	...	...	...
Cork Electric	Dec. 14	432	445	+ 13	50	25,491	+ 580
Croydon Corporation ...	*	...	...	...	...	...	...
Derby Corporation	„ 23	1,015	1,163	+ 148	38½	43,528	+ 3,021
Dover Corporation	*	...	...	...	...	...	...
Dublin & Lucan	„ 22	129	126	— 3	25	4,050	+ 329
Dublin United	„ 15	5,714	5,973	+ 259	50	304,680	+ 1,932
Dundee City	„ 20	1,331	1,340	+ 9	31⅔	43,823	+ 1,089
East Ham Corporation ...	„ 23	1,393	1,175	— 218	38½	49,798	— 493
Exeter Corporation.....	„ 22	392	400	+ 8	38	15,556	+ 906
Glasgow Corporation	„ 23	22,290	22,942	+ 652	29⅜	691,824	+ 53,193
Glasgow Subway.....	„ 23	1,246	1,441	+ 195	51	59,466	+ 4,656
Glossop (U. Elec. Supp.)	„ 16	123	124	+ 1	51	7,073	+ 685
Halifax Corporation.....	„ 19	1,945	1,815	— 130	37½	84,386	+ 987
Do. Motor Omnibuses	„ 19	41	44	+ 3	37½	1,876	+ 6
Hastings & District.....	„ 22	849	929	+ 80	51	52,712	+ 3,718
Huddersfield Corp.	„ 23	2,637	2,642	+ 5	38	108,427	+ 8,945
Hull Corporation	„ 23	3,217	3,374	+ 156	38	120,209	+ 1,886
Ilford U.D.C.	„ 23	636	682	+ 46	38	26,109	+ 1,292
Ilkeston Corporation ...	*	...	...	...	...	...	...
Ipswich Corporation	„ 23	504	454	— 50	38	19,794	— 1,330
Isle of Thanet	„ 23	258	251	— 7	12	3,193	+ 34
Kilmarnock Corp.	„ 23	163	169	+ 6	31⅔	5,597	+ 207
Lanarkshire	„ 14	2,008	2,096	+ 88	50	115,394	+ 16,430
Lancashire United	„ 20	1,546	1,402	— 144	51	92,853	+ 5,338
Leeds City.....	„ 16	8,641	9,257	+ 616	38	367,345	+ 33,518
Leicester Corporation ...	*	...	...	...	...	...	...
Leith Corporation	„ 23	749	813	+ 64	31⅔	27,951	+ 3,513
Leyton U.D.C.....	„ 21	1,627	1,394	— 233	38	62,995	+ 710
Liverpool Corporation...	„ 23	14,283	15,017	+ 734	51½	722,873	+ 40,482
Llandudno & Colwyn B.	„ 15	206	211	+ 5	2⅔	398	+ 24
London County Council	„ 6	44,922	44,565	— 357	35⅔	1,729,904	+ 154,254
London Genl. Omnibus	*	...	...	...	...	...	...
London United.....	*	...	...	...	...	...	...
Lowestoft Corporation...	*	...	...	...	...	...	...
Maidstone Corporation..	„ 21	204	190	— 14	38	8,337	— 109
Manchester Corp.....	„ 23	17,463	17,762	+ 299	36	719,829	+ 37,167
Met. Elec. Trys.	*	...	...	...	...	...	...
National Steam Car.....	*	...	...	...	...	...	...
Nelson Corporation	„ 16	174	179	+ 5	37½	7,934	+ 595
N'castle-on-Tyne Corp.	„ 16	5,778	6,658	+ 880	37	250,709	+ 16,855
Newport (Mon.) Corp....	„ 20	856	1,067	+ 211	35	36,972	+ 4,536
New St. Helens & Dist.	„ 20	929	849	— 80	25	28,131	+ 2,107
Northampton Corp.....	„ 22	794	782	— 12	38	27,461	— 570
Nottingham Corp.....	„ 21	3,804	3,626	— 178	38	149,424	+ 6,488
Oldham Corporation ...	„ 24	1,978	2,265	+ 287	39	96,322	+ 5,618
Portsmouth Corp.....	„ 16	2,104	2,148	+ 44	...	...	...
Preston Corporation.....	„ 20	1,007	1,037	+ 30	37⅔	42,200	+ 5,197
Provincial	„ 23	2,041	2,093	+ 52	12	24,529	— 11
Reading Corporation.....	„ 14	773	808	+ 35	37⅔	32,052	+ 2,656
Rhondda Tramways.....	„ 14	1,170	1,162	— 8	50	64,298	+ 5,560
Rochdale Corporation...	„ 23	1,659	1,476	— 183	38½	68,189	+ 2,320
Rotherham Corp.....	„ 20	1,216	1,494	+ 278	37⅔	59,053	+ 14,723
Salford Corporation.....	„ 18	5,133	3,403	— 1,730	36⅔	204,568	+ 9,137
Sheffield Corporation....	„ 24	8,830	9,933	+ 1,103	39½	413,371	+ 60,186
Southampton Corp.....	„ 20	1,541	1,578	+ 37	37⅔	63,786	+ 6,136
Southend-on-Sea Corp...	„ 20	623	602	— 21	38	36,112	+ 4,133
South Met. Trys.	*	...	...	...	...	...	...
South Shields Corp.....	„ 23	806	844	+ 38	38½	32,340	+ 1,830
Sunderland Corp.....	„ 17	1,472	1,648	+ 176	37	61,681	+ 4,976
Sunderland District...	„ 6	510	594	+ 84	6	3,779	+ 590
Swindon Corporation ...	Nov. 22	165	192	+ 27	33⅔	7,050	+ 290
Torquay Tramways.....	Dec. 14	380	432	+ 52	50	29,561	+ 2,618
Tyneside Trys. & Tmrds.	„ 13	479	530	+ 51	24	15,836	+ 1,415
Wallasey Corporation ...	„ 23	1,182	1,247	+ 65	34½	52,954	+ 3,227
Walsall Corporation.....	„ 23	881	819	— 62	52	41,896	+ 3,363
Walthamstow U.D.C....	„ 23	797	999	+ 202	38	44,874	+ 10,245
Warrington Corp.....	Nov. 23	438	491	+ 53	34	17,413	+ 1,469
West Ham Corporation	Dec. 21	3,280	2,979	— 301	37⅔	122,555	+ 4,611
Wigan Corporation	„ 21	1,625	1,448	— 177	38	64,106	+ 5,257
Yorkshire (W. Riding)...	„ 24	1,726	1,733	+ 7	52	91,222	+ 9,204

* Issue of Traffic Returns suspended during the War.

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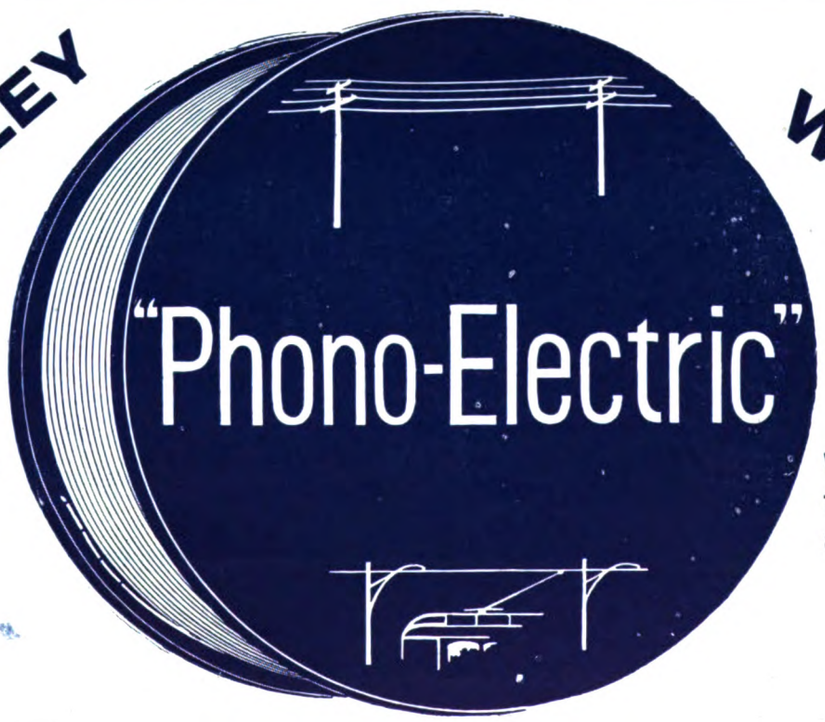

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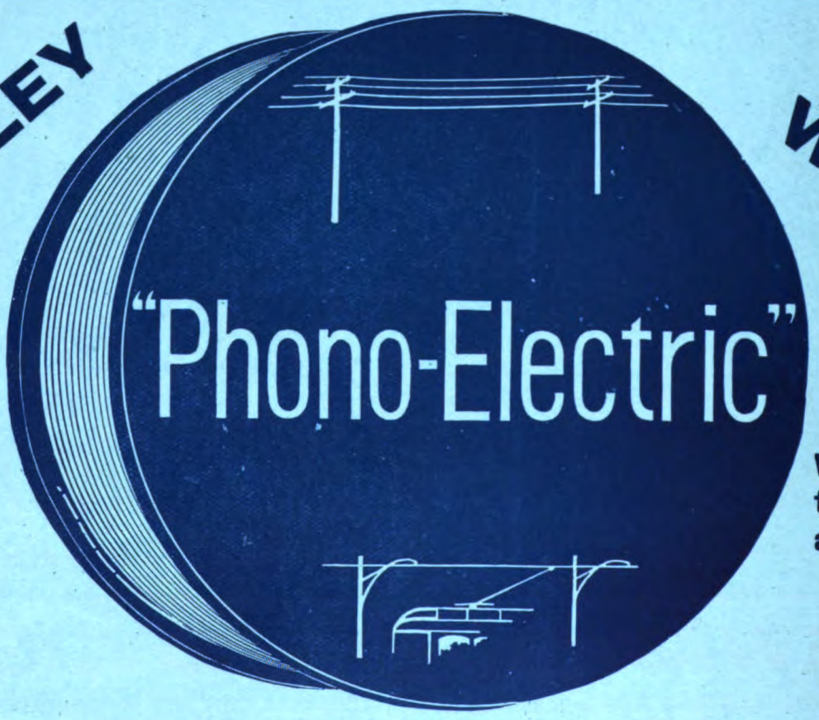

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NAME OF COMPANY OR FIRM.	ADDRESS.	TELEGRAPHIC ADDRESS.	TELEPHONE No.
Albion Motor Car Co., Ltd.	Scotstoun, Glasgow	Automobile, Glasgow	Scotstoun, Western, 1991
Allen & Co., Ltd., Edgar	Imperial Steel Works, Tinsley, Sheffield	Allen, Sheffield	Sheffield, 917, 265.
Allen & Co., Ltd., Edgar (Tramway Dept.)	Imperial Steel Works, Tinsley, Sheffield	Askham, Sheffield (Tramway and Machinery)	Sheffield, 213.
Anger Manufacturing and Supply Co., Ltd.	Bank Chambers, Preston, Lancs.	Brakjuster, Preston	Preston, 1033.
Armstrong, Stevens & Son, Ltd.	Whittall Street, Birmingham	Armstrongs, Birmingham	Birmingham, 6148.
Auto-Ticket Printing Co., Ltd.	41, Wapping, Liverpool	Extension, Liverpool	Bank, Liverpool, 4646.
Avon India Rubber Co., Ltd.	Melksham, Wilts	Rubber, Melksham	Melksham, 2.
Babcock & Wilcox, Ltd.	30, Farringdon Street, London, E.C.	Babcock, London	City 6470, (8 lines).
Baker & Co. (Rotherham), Ltd., J.	Brinsworth Iron and Wheel Works, Rotherham	Brinsworth, Rotherham	Rotherham, 89 and 435.
Beckett, Laycock & Watkinson, Ltd.	Willesden, London, N.W.	Beclawat, London	Willesden, 1558
Belliss & Morcom, Ltd.	Ledsam Street Works, Birmingham	Belliss, Birmingham	Birmingham, 3044.
Bell Punch & Printing Co., Ltd.	52-58, Tabernacle Street, London, E.C.	Belpunch, Finsquare, London	Central, 7531.
Blackwell & Co, Ltd., R. W.	14, Great Smith Street, London, S.W.	Kurkee, London	Victoria, 4765.
Bridgeport Brass Co.	Broadway and Murray Street, New York, U.S.A.	—	—
Brill Co., J. G.	110, Cannon Street, London, E.C.	Axles, London	Bank, 6018.
Britannia Lamp & Accessories Co., Ltd.	Britannia House, 48, Milton Street, London, E.C.	Aetnaco, Barb, London	City 1257 (2 lines)
British Ackley Brake and Supply Co., Ltd.	Westinghouse Building, Norfolk Street, London, W.C.	Acklebrusa, Estrand, London	Gerrard, 3272.
British Aluminium Co., Ltd.	109, Queen Victoria Street, London, E.C.	Cryolite, London	City 2676 (3 lines).
British Hele-Shaw Patent Clutch Co., Ltd.	Suthers Street, Oldham	Prehension, Oldham	Oldham, 1133
British Insulated & Helsby Cables, Ltd.	Prescot, Lancs.	Insulator, Prescot	Prescot, 8.
British Thomson-Houston Co., Ltd.	Rugby	Asteroidal, Rugby	Rugby 54 (5 lines).
British Westinghouse Electric & Mfg. Co., Ltd.	Westinghouse Building, Norfolk Street, London, W.C.	Multiphase, Estrand, London	Gerrard, 3261 and 2476.
Brockhouse & Co., Ltd.	Victoria Works, Hill Top, West Bromwich	Brockhouse, West Bromwich	West Bromwich, 228.
Burford & Co., Ltd., H. G.	11, Waterloo Place, London, S.W.	—	Regent, 5281.
Carbic, Limited	51, Holborn Viaduct, London, E.C.	Carbicitis, Cent., London	Holborn, 511
"Cedes" Electric Traction, Ltd.	112, Great Portland Street, London, W.	Cedesmixte, Wesdo, London	Mayfair, 6130.
Clay & Atkinson	Bower Street, Bradford	—	Bradford, 1263.
Clayton & Co. (Huddersfield), Ltd.	Karrier Works, Huddersfield	Karriakar, Huddersfield	Huddersfield, 1441, 2, 3.
Cleveland Metal Co., Ltd.	Bridge Works, Stockton-on Tees	Efficiency, Stockton	Stockton-on-Tees, 409
Clough, Smith & Co., Ltd.	Regent House, Kingsway, London, W.C.	Clufmit, Westcent, London	Gerrard, 3288.
Coan, R. W.	219, Goswell Road, London, E.C.	Krankases, Isling-London	Central, 4879; City, 3846.
Commercial Cars, Ltd.	Biscot Road, Luton	Komerkars, Luton	Luton, 192 and 193.
Consolidated Accessories Co.	181, Queen Victoria Street, London, E.C.	Inbrake, Cent, London	Central, 5735.
Courtenay, J. W., Ltd.	Amberley House, Norfolk Street, W.C.	Tramigro, London	City, 7630.
Coventry Chain Co., Ltd.	Spon End Works, Coventry	Chains, Coventry	Coventry, 830.
Daimler Co., Ltd.	Daimler Works, Coventry	Daimler, Coventry	Coventry, 505.
Dennis Bros. (1913), Ltd.	Onslow Works, Guildford	Dennis, Guildford	Guildford, 129 and 329.
Dick, Kerr & Co., L'd.	Abchurch Yard, Cannon Street, E.C.	Dicker, Cannon, London	Bank 5806 (4 lines).

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THE AUTOBUS

IN THE TRAMWAY WORLD.

Motor Traffic Section.

When "The Tramway and Railway World" was founded in 1892, motor traction was, of course, scarcely dreamt of, but the avowed object of the paper was to encourage all new methods that gave promise of usefulness.

In pursuance of that policy the progress of motor traction received early attention. Commenting on the historic motor parade to Brighton in 1896, "The Tramway and Railway World" predicted that

"It would give a prodigious impulse to transport both by road and rail."

Within a decade this prophecy was abundantly fulfilled and so much space has been devoted to the new industry that in 1906 a special

MOTOR TRAFFIC SECTION

was added. Every illustrated issue thus contains a section devoted especially to motor cars for Public Service, and includes articles on current topics, illustrated descriptions of new types of vehicles and accessories, and the latest news.

Public Service Motor Cars.

The importance of this section will be gathered from the fact that an increasing number of the leading municipal authorities, railway and transport companies, now own and operate large fleets of motor vehicles of various types, including omnibuses, char-a-bancs, motor lorries for the transport of goods, parcel delivery vans, tower wagons, motor street sweepers, etc.

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Continued from page iii.)

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NAME OF COMPANY OR FIRM.	ADDRESS.	TELEGRAPHIC ADDRESS.	TELEPHONE NO.
Docker Brothers, Ltd.	170, Bishopsgate, London, E.C.	Matured, London	London Wall, 775.
Dunlop Rubber Co., Ltd.	Manor Mills, Aston, Birmingham	Elastic, Birmingham	Birmingham, East, 123.
Edison Accumulators, Ltd.	2 and 3, Duke Street, London, S.W.	Edibatt, St. James, London ...	Regent 5470 (6 lines).
Edison Swan Electric Co., Ltd.	Ponders End, Middlesex	Ediswan, Ponders End ...	Enfield, 520.
Electro-Mechanical Brake Co., Ltd.	Eagle Works, West Bromwich...	Brakes, West Bromwich ...	West Bromwich, 291
Equipment & Engineering Co.	Westinghouse Building, Norfolk Street, London, W.C.	Kharparts, Estrand, London ...	City 1088 (2 lines).
Fodens, Ltd.	Sandbach, Cheshire	Foden, Sandbach	Sandbach, 7.
General Electric Co., Ltd....	67, Queen Victoria Street, London, E.C.	Polyphase, London	London Wall, 3600.
General Seating Co., Ltd....	13, City Road, London, E.C.	Cushioning, Finsquare, London	London Wall, 6187.
Glasgow Numerical Printing Co.	31, Finnieston Street, Glasgow	Tickets, Glasgow	Glasgow, 5350.
Glenn, J. Barber	Moorgate Station Chambers, London, E.C.	Octet, Ave., London	London Wall, 262.
Goodyear Tyre & Rubber Co., Ltd.	Central House, Kingsway, London, W.C.	Gotyruco, London	Regent, 3324.
Green & Sons, Ltd., E.	2, Exchange Street, Manchester	Economiser, Manchester ...	Manchester, 1375.
Green & Co. (Feltham), Ltd., Geo. W. ...	Q-Fel Works, Feltham	Cufel, Feltham	—
Grover & Co., Ltd.	Carpenters' Road, Stratford, E.	Adopted, Strat., London ...	Stratford, 984 and 985.
Hadfields, Ltd....	Hecla Works, Sheffield	Hadfield, Sheffield	Sheffield, 750, 2628, and 263
Hailey's Industrial Motors, Ltd.	Yoker, Glasgow	Horseless, Glasgow	Clydebank, 196 and 197.
Henley's Telegraph Works, Ltd.	13 and 14, Blomfield Street, London Wall, E.C. ...	Henletel, Ave., London ...	London Wall, 4560.
Henley's Telegraph Works, Ltd. (Tire Dept.)	18, Union Street, Moorfields, E.C.	Hetewocol, Ave., London ...	London Wall, 8886.
Herbert Frood Co., Ltd.	Sovereign Mills, Chapel-en-le-Frith...	Friction, Chapel-en-le-Frith ...	Chapel-en-le-Frith, 19
Hurst, Nelson & Co., Ltd.	Motherwell, Scotland	Nelson, Motherwell	Motherwell, 44.
International Time Recording Co.	57, City Road, London, E.C.	Countable, Finsquare, London	London Wall, 6374.
Johnson & Phillips, Ltd.	Charlton, London, S.E.	Juno, Charlton, London, S.E.	Greenwich, 400.
Lacre Motor Car Co., Ltd.	78, York Road, King's Cross, London, N.	Unbaffled, London	North, 2708
Leyland Motors, Ltd.	Leyland, Lancs.	Leymotors, Leyland	Leyland, 37.
Lorain Steel Co.	36-38, New Broad Street, London, E.C.	Thoughtful, London	London Wall, 8186.
Macintosh & Co., Ltd., Chas.	Cambridge Street, Manchester	Macintosh, Manchester ...	Manchester, Central, 7147.
M. & G. Truck and Engineering Co., Ltd....	St. John's House, 124-127, Minories, London, E. ...	Emgestock, Ald., London ...	Avenue, 729.
Magnolia Anti-Friction Metal Co., Ltd. ...	49, Queen Victoria Street, London, E.C.	Magnolier, Cannon, London ...	City 6596.
Maudslay Motor Co., Ltd....	Parkside, Coventry	Maudslay, Coventry	Coventry, 110.
Millars' Timber and Trading Co., Ltd. ...	Pinners' Hall, London, E.C.	Jarrah, Stock, London ...	London Wall, 368.
Mirrlees, Watson Co., Ltd.	Scotland Street, Glasgow	Mirrlees, Glasgow	South Side, 1781.
Motor Rail and Tram Car Co., Ltd.	79, Lombard Street, London, E.C.	—	Avenue, 1777.
Motor Traction...	20, Tudor Street, London, E.C.	Autocars, Fleet, London ...	City, 2848.
Municipal Tramways Association	C. J. Spencer, 7, Hall Ings, Bradford	Tramways, Bradford	Bradford 2381 and 2382.
Napier & Son, Ltd., D.	14, New Burlington Street, London, W.	Nitrifier, Reg., London ...	Gerrard, 8926.
Nobles and Hoare	Cornwall Road, Stamford Street, London, S.E. ...	Nobles, Watloo, London ...	Hop, 1302.
Oriental Tube Co., Ltd.	West Bromwich	Tubes, West Bromwich ...	West Bromwich, 45.
Patent File and Tool Co., Ltd.	8, White Street, Moorfields, E.C.	Ironheads, London	London Wall, 2683 and 2968.
Peacock Brake Co.	181, Queen Victoria Street, London, E.C.	Inbrake, Cent London ...	Central 5735.
Pease & Partners, Ltd.	Tees Ironworks, Middlesbrough	Pease, Middlesbrough ...	Middlesbrough, 917.
Peckham Truck and Engineering Co., Ltd. ...	26, Budge Row, Cannon Street, London, E.C. ...	Truxenpeck, London	City, 3294.
Pinchin, Johnson & Co., Ltd.	Minerva House, 26 and 27, Bevis Marks, London, E.C.	Pinchin, Ald., London	Avenue, 910.
R.E.T. Construction Co., Ltd.	Balm Road, Hunslet, Leeds	Raillessly, Leeds	4832 Central, Lee's
Ruberoid Co., Ltd.	81-83, Knightrider Street, London, E.C.	Ruberoid, Cent., London ...	Central, 1480.
Russell & Sons, Ltd., James	Crown Tube Works, Wednesbury	Russell, Wednesbury	Wednesbury, 2.
Scholey & Co., Ltd.	56, Victoria Street, London, S.W.	Scolanco, Sowest, London ...	Victoria 6663 (2 lines).
Shepherds' Parging Block Co., Ltd.	Milkstone, Rochdale	Shepherd, Milkstone, Rochdale	Rochdale, 912.
Shrewsbury & Challiner Tyre Co., Ltd. ...	Kay Street, Ardwick Green, Manchester	Challiner, Manchester	Manchester, Central, 962.
Siemens Brothers Dynamo Works, Ltd. ...	38 & 39, Upper Thames Street, London, E.C. ...	Siemotor, Cent, London ...	City 5350 (9 lines).
Simplex Conduits, Ltd.	Garrison Lane, Birmingham	Economy, Birmingham ...	Birmingham, Victoria, 535.
Simplex Rubber Co., Ltd.	Scrubbs Lane, Willesden, London, N.W.	Simplexine, Kensal, London ...	Willesden, 550.
Skefko Ball Bearing Co., Ltd	Skefko Works, Luton	Skefko, Luton	Luton, 418.
Smethwick Stamping Co.	Bridge Street, Smethwick	—	—
Smith & Co., Frederick	Anaconda Works, Salford, Manchester	Anaconda, Manchester ...	Manchester, 2334.
Spencer, Moulton & Co., Ltd., George ...	239, Deansgate, Manchester	Solspen, Manchester	Manchester City, 5180
Standard Underground Cable Co.	Dock House, Billiter Street, London, E.C.	—	Avenue, 5463.
Stewarts & Lloyds, Ltd.	41, Oswald Street, Glasgow	Lapweld, Glasgow	Glasgow, City, 9880.
Straker-Squire, Ltd.	Nelson Square, Blackfriars, London, S.E.	Rhomboidal, London	Hop, 369 and 370.
Taylor John	7, Strand Street, Liverpool	Velo, Liverpool	Liverpool (Bank), 4484.
"The Coventry" Chain Co., Ltd.	Spon End Works, Coventry	Chains, Coventry	Coventry, 830.
Thermit, Ltd.	675, Commercial Road, London, E.	Fulmen, Step, London ...	East, 4157.
Thornycroft & Co., Ltd.	Caxton House, Westminster, London, S.W.	Thornycroft, London	Victoria, 8000
Tilling-Stevens, Ltd.	Victoria Works, Maidstone	Tilling-Stevens, Maidstone ...	Maidstone, 117.
Titan Trackwork Co., Ltd....	Rutland Road, Sheffield	Crossings, Sheffield	Sheffield, Central, 798.
Tramways and Light Railways Association	Caxton House, Westminster, London, S.W.	Tralitrayl, Vic., London ...	Victoria, 2110.
Tramway and Railway World	Amberley House, Norfolk Street, W.C.	Tramigro, London	Gerrard, 2948.
Tramway Supplies, Ltd.	160, Woodhouse Lane, Leeds	Controller, Leeds	Leeds, Central, 3488.
Tudor Accumulator Co., Ltd.	3, Central Buildings, London, S.W.	Subconical, London	Victoria, 2600.
Tyne Metal Co., Ltd....	Skinnerburn Road, Newcastle-on-Tyne	Floating, Newcastle-on-Tyne ...	Newcastle, 2943.
Underground Electric Railways Co.	Electric Railway House, London, S.W.	Underneath, Vic., London ...	Victoria, 6800.
United Electric Car Co., Ltd.	Preston, Lancs.	Prescar, Preston	Preston, 219 and 220.
Val de Travers Asphalte Paving Co., Ltd. ...	Hamilton House, Bishopsgate, London, E.C. ...	Traversable, Ave., London ...	London Wall, 7467.
Valor Co., Ltd.	Rocky Lane, Aston Cross, Birmingham	Valor, Birmingham	Birmingham, East, 252 and 259
Vandervell & Co., Ltd., C. A.	Warple Way, Acton Vale, London, W.	Vanteria, London	Chiswick, 1234
Walter Scott, Ltd.	Leeds Steel Works, Leeds	Bessemer, Leeds	Leeds, 510.
Waygood-Otis, Ltd.	Falmouth Road, London, S.E....	Waygood, Sedist, London ...	Hop, 4000.
Wells, A. C. & Co.	102-104, Midland Road, St. Pancras, London, N.W.	Unbreakable, Kincross, London	North, 341. [9886
White & Co. J. G.	9, Cloak Lane, Cannon Street, London, E.C.	Whitterick, Cannon, London ...	London Wall, 3306, and Central
White Motors & Accessories, Ltd.	Concanon Road, Brixton, London, S.W.	Genisean, London	Brixton, 565 and 566
Williamson, Alfred	North Mill Printing Works, Ashton-under-Lyne. ...	—	Ashton-under Lyne, 320.
Wood-Milne, Ltd.	Ribble Bank Mills, Preston, Lancs.	Comfort, Preston	Preston, 413.
Yarwood & Co., Ltd., John...	Bramber Rd., North End Rd., Fulham, London, S.W.	Bernotor, Weskkens, London...	Kensington, 4211.
Youngs	Ryland Street Works, Birmingham	Oldens, Birmingham	Midland, 301
Zenith Carburetter Co., Ltd.	40-42; Newman Street; London; W.	Zenicarbur Ox, London ...	Regent 4812 and 4813.

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